IORDÑ
ON
BATHS

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A
DISCOURSE
OF
Natural Bathes,
AND
Mineral Waters.

WHEREIN,

The Original of Fountains in general is declared. The nature and difference of Minerals, with Examples of particular Bathes. The Generation of Minerals in the Earth, from whence both the Actual Heat of Bathes, and their Virtues proceed. By what means Mineral Waters are to be diſcover'd. And laſtly, of the Nature, and Uſes of Bathes, but eſpecially, of our Bathes at *Bathe*, in *Somerſet-ſhire.*

By EDW. JORDEN, Doctor in Phyſick.

The Third Edition, reviſed and enlarged; with ſome Particulars of the Authors Life.

To which is added, An Appendix concerning *Bathe*, wherein the Antiquity, both of the Bathes and City, is more fully diſcours'd; with a Brief Account of the Nature, and ~~the~~ Virtues of the *Hot Waters* there.

By THOMAS GUIDOTT, *M. B.*

Imprinted at *London*, and are to be ſold by *Thomas Salmon*, Bookſeller in *Bathe.* 1669.

* * *

Imprimatur

Sam. Parker RR^{mo} Domino, ac D^{no} *Gilberto* Archi-Ep. *Cantuar.* a ſacris domeſticis.

Ex ædib. *Lambeth.*
Novemb. 7. 1668.

* * *

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TO THE
Right Honourable,
FRANCIS Lord *COTTINGTON*,

Baron of *Hanworth*, Chancellour of the
Exchequer, and one of his Majeſties
moſt Honourable Privy Council.

THE profitable uſe of Bathes, both for neceſſity and comfort, is ſuch, and ſo well confirmed from all antiquity, as I need not labour to illuſtrate it more; only it hath been the ill hap of Our *Countrey Bathes to lie more obſcure then any other throughout Chriſtendome, although they deſerve as well as the beſt, becauſe very few have written any thing of them, and they either have not mentioned, or but ſlightly paſſed over the main points concerning their cauſes and originals; contenting themſelves with an emperical uſe of them. This hath made me, through the inſtigation alſo of ſome of my worthy friends, to attempt ſomewhat of this kind: which if it give not ſatisfaction according to my deſire, yet may be a provocation to ſome others, to perfect that which I have begun. And ſeeing I do it for the uſe of my Country, I have neglected* *curious ornaments to garniſh it withall, but have clad it in a plain Sute of our Country Cloath; without welt or gard: not deſiring it ſhould ſhew it ſelf in forain parts:* Mea cymba legat littus.

But in this mine undertaking, I find my ſelf expoſed to many cenſures, both concerning ſome Paradoxical Opinions in Philoſophy, which notwithſtanding I deliver not gratis, *but confirmed with good grounds of reaſon and authorities: as alſo concerning the reformation of our Bathes, which do daily ſuffer many indignities more wayes then I have mentioned, under the tyranny of ignorance, impoſture, private reſpects, wants, factions, diſorder, &c. ſo as they are not able to diſplay their virtues, and do that good for which God hath ſent them to us; and all for want of ſuch good government as other Bathes do enjoy. I blame not our City herein, unto whoſe care the ordering of theſe Bathes is committed, the diſorders and effects being ſuch as are out of their verge, and neither in their power, nor in their knowledge to redreſs. For they have ſufficiently teſtified their deſire of reforming all ſuch abuſes, when they voluntarily did joyn in Petitioning the late King* James *of bleſſed memory, to that end: by whoſe death this Petition alſo died. And they knew well that it muſt be a ſuperior power* *that muſt effect it. In theſe reſpects I have need of ſome noble and eminent Patron to protect both me and my Bathes, whoſe cauſe I take upon me to plead, and to advance, according to their due deſert: but eſpecially for the Bathes ſake, which I deſire may flouriſh to the utmoſt extent of benefit to the people; and to have all impediments removed out of their way, which may hinder them in the progreſs of their virtues. This is the cauſe Sir, why I preſume to dedicate theſe my labours to your Honour, who having obſerved in forrain parts, the uſes and governments of all ſorts, and being both by the favour of his Majeſty well able, and by your noble diſpoſition well inclined and willing to maintain good order and diſcipline, will, I doubt not, excuſe this boldneſs, and pardon my preſumption. Conſider Sir, that this is your native Countrey, which naturally every man doth affect to advance, and theſe Bathes are the principal Jewels of your Countrey, and able to make it more famous then any other parts of this Kingdom, and in advancing them, to advance your Name to all poſterity. Wherefore howſoever my ſelf deſerve but ſmall reſpect from you, yet I beſeech you reſpect the Bathes of your Countrey, and me as a wellwiſher unto them.*

And as the common opinion of your great worth and abilities, have moved me to this boldneſs, ſo the particular favours of your Noble Lady, and the encouragement of your learned Phyſitian, Doctor Baskervill, *mine eſpecial Friend, who hath ſpurred me on to this work, have removed out of my mind all ſuſpition of miſconſtruction. But that as mine intent hath been meerly the enlarging of the knowledge of thoſe points concerning Bathes, and more eſpecially of our Bathes in* Somerſet-ſhire; *ſo you will be pleaſed to accept of this publick invitation by me to do your Countrey good, and your ſelf honour, which I wiſh may never be disjoyned. And to me it will be no ſmall encouragement to devote my ſelf and my beſt endeavours to your ſervice. So I humbly take my leave this* 23. Aprilis, 1632.

Your Lordſhips moſt humble ſervant,

ED. JORDEN.

A Preface

TO THE

READER.

THE enſuing Diſcourſe of *Natural Bathes, and Mineral Waters*, of the learned Author, Dr. *Jorden*, having found ſo kind an entertainment in the World, as to have paſſed the Preſs twice in a Year; and the Copies of both Impreſſions at this time ſo few, as not to anſwer the Enquiries of perſons deſirous to peruſe them, a third Edition was neceſſary, the Care of which, together with ſome Additional Enlargements, being requeſted of me, I thought it might be a thing acceptable to many, to review the Work, and revive the memory of ſo worthy a Perſon. Eſpecially in this looſe, and quacking age of ours, in which Empericks, and juggling Medicaſters do ſo much abound, that 'tis almoſt as hard a matter to meet with a regular and well accompliſh'd

Phyſitian now, as it was in former times for *Diogenes* to find an honeſt man.

The great occaſion of this general abuſe of Phyſick I obſerve to be, mens beginning uſually at the wrong end. For the moſt ſuppoſing the Practice of Phyſick to be a mere Trade, and Medicines the Ware to furniſh themſelves withall, make what haſte they can to get, though upon Credit, a Pack of Receits, which they cry up as the moſt effectual, and *Triarian* Remedies; and having made a ſhift to truſs up, with the former fardle of Common Receits, ſome few Specificks, preſently ſet up for eminent Phyſitians, when, to give them their due, they deſerve nothing leſs then that Honourable Name, being indeed but Pedlers in the Faculty.

For there are, beſides the uſe of Medicines, which in its proper place is not to be neglected; many very ſignificant things to be known and ſtudied by a Phyſitian; as, after the præliminary helps of the Tongues, and Natural Philoſophy, the ſtructure and uſes of the parts of the body; the virtues of Plants; the compoſitions of Medicines; the Nature, Cauſes, and Signs of Diſeaſes; not to mention the knowledge, at leaſt, if not the practice of Manual Operations, with ſome Pyrotechnical Endeavours. All theſe, vaſt dominions in themſelves, a Son of Art (to make bold with one of their expreſſions) ſhould in ſome meaſure command. So that I have in my thoughts ſometimes reſembled a Compleat Phyſitian to the draught of a Man, ſtanding on the two Legs of Anatomy & Herbary, Operating (if need be) with the hands of Chyrurgery, and Pharmacy, having a Chymical Head, and the bulk of his body made up of the Nature, Kind, and Cures of Diſeaſes, which we may not improperly, term a Body of Phyſick.

But theſe Agyrtæ, and Quackſalvers, are as far from theſe ὅσον οὐρανός ἐστ' ἀπὸ γαίης. They for the moſt part, know no other tongue then their Mothers, and are as deſtitute of Philoſophy, as a rational method. Every Plant to them is an All-heal, and every trite Medicine a *Panpharmacon.* The Body of Man, they think contains no other parts then what they ſee in a Harſelet, and the fire is as dreadfull to them, as to the burnt Child. Yet they will ſometimes make bold to uſe the Lancet, and dextrouſly wound the Heart through the Arm. In brief, they meddle with what they do not underſtand, and are the ſpots, and ſtains of the Faculty to which they moſt injuriouſly pretend. but to reſign thoſe Juglers to their Ignorance and Self-Conceit, and thoſe that are willing to die at a cheaper rate to their cruel mercies, and confident Undertakings, I ſhall give what account I can of the Author of this Book (a man of a temper quite different from the former) & what alterations have been made in it.

As to the Author (whom I had not the happineſs to know otherwiſe then by this his Picture, being at the time of his death, and ſome years after in an incapacity of knowing any thing unleſs with a knowledge of Præexiſtence; yet) I underſtand he was a Gentleman of a good Family, and being a younger Brother, was by his Father deſigned for a Profeſſion, for which when he had accompliſh'd himſelf by a convenient Courſe of Studies in his own Country (I think at *Oxford*) travelled abroad to ſee the manners and cuſtoms of the Univerſities beyond Sea; and having ſpent ſome time there, eſpecially at *Padua* (where he took his Degree of Doctor in Phyſick) returned home, practiſed at London, became an eminently ſolid and rational Philoſopher and Phyſitian, and one of that famous and learned Society, *The Kings Colledge of Phyſitians there.*

In his Travels, undertaking in the company of ſome zealous Jeſuites, the defence of the Proteſtant Religion, he ſo much troubled their patience, that they reſolved to terminate that diſpute of his in a perpetual Silence, which they had effected, had not his Countryman, one of the number, but more mercifull then the reſt, (by awaking him out of his natural ſleep, preventing the ſleep of death) informed him of their deſign, to be put in execution that night; whereupon he preſently withdrew, and left not only the Houſe, but the Place, and eſcaped the cruelty of theſe blood-thirſty Religioſo's; who ſhortly after his departure, brake open his door, entred his Chamber, and approached his Bed, with a full reſolution to have acted their execrable Tragedy.

He had a great natural inclination to Mineral Works, and was at very great Charges about the ordering of Allum, which ſucceeding not according to expectation, he was thereby much prejudiced in his Eſtate; of which he complains in the 59 page of the following Diſcourſe. He was much reſpected by King *James*, who committed the Queen to his Care, when ſhe uſed the Bath~~e~~, and gave him a Grant of the Profit of his Allum Works, but upon the importunity of a Courtier, as I am informed, afterwards revoked it; whereupon the Doctor made his application to the King, but could not prevail, though the King ſeemed to be more then ordinarily ſenſible of his Condition.

Sr Arthur Ingram.

Whilſt he practiſed in *London* there was one *Anne Gunter*, troubled with ſuch ſtrange and unuſual Symptomes, that ſhe was generally thought and reported by all that ſaw her to be bewitch'd. King *James* hearing of it ſent for her to *London*, and pretending great pitty to her, told her, he would take care for her relief, in which thing he employed Doctor *Jorden*, who, upon examination, reported to the King, that he thought it was a Cheat; and tincturing all ſhe took with harmleſs things, made her believe that ſhe had taken Phyſick, by the uſe of which, ſhe ſaid, ſhe had found great benefit. The Doctor acquainting his Majeſty that he had given her nothing of a medicinal nature, but only what did ſo appear to the Maid, and alſo, that though when he repeated the Lords Prayer, and Creed in Engliſh, ſhe was much out of order, yet at the rehearſal of the ſame in Latine ſhe was not concern'd, the King was confirmed in what he had ſuſpected before, and the Doctor had ſuggeſted. Whereupon the King dealing very plainly with her, and commanding her to diſcover the Truth unto him, the maid, though at firſt very unwilling to diſcloſe the Juggle, yet, upon the Kings importunity, and promiſe to her of making up what damage ſhould accrue from the diſcovery, confeſſed all, and his Majeſty received from her own mouth this Account. That ſometime before there happened a difference between a Female Neighbour of her Fathers and himſelf, and having in his own apprehenſion, no better way to be avenged of her then this, impiouſly cauſed his Daughter, on the receiving of the Sacrament, to engage to imitate one bewitch'd, and aſcribe it to that woman, which ſhe did, and acted this part in ſo exact and wonderfull a manner, that ſhe deceived all the Countrey where ſhe lived, who thought it to be a truth. After which Confeſſion ſhe was very quiet, &, the King giving her a Portion, [redacted] afterwards married, being by this ſubtle artifice perfectly cured of her mimical Witchery.

His Wife was a Gentlewoman of a

Name differing but in one letter from his own, Daughter to one Mr. *Jordan*, a *Wiltſhire* Gentleman; which came to paſs after this manner. The Doctor being on a Journey, benighted on *Salisbury Plain*, and knowing not which way to ride, happened to meet a Shepherd, of whom he made enquiry what places were near, where he might have entertainment for that night; the Shepherd telling him there was no place near enough for him conveniently to reach in any ſeaſonable time, the Doctor asked, what Gentleman lived thereabouts; the Shepherd replyed, there was one Mr. *Jordan*, not far off, a man of good quality, and a great eſtate. Preſently the Doctor (looking on this as a good Omen) reſolved on his houſe, where he was ſo kindly entertained, and ſo well accepted, that Mr. *Jordan* underſtanding him to be a Batchelour, beſtowed his Daughter on him, with a conſiderable Fortune.

After he had practiſed ſome time in *London*, he came hither, and ſetled at *Bathe*, where living many years, his Converſation was ſo ſweet, his Carriage ſo obliging, & his Life ſo anſwerable to the port & dignity of the Faculty he profeſſed,

ſed, that he had the Applauſe of the Learned, the Reſpect of the Rich, the Prayers of the Poor, and the Love of all.

I hear but of four Children he had that attained to any maturity of age (beſides one who periſhed by that, which by the bleſſing of God, and the aſſiſting help of proper Remedies, hath prolonged the life of many, the *Bath.*) Two Sons, and as many Daughters. *Edward* the elder, being an Officer in the unhappy deſign of the Iſle of *Rhee*, was there unfortunately ſlain, making his Colours, he managed, his winding ſheet. The younger, *Benjamin*, or rather *Benoni*, the Son of his affliction, a man more profuſe and extravagant, deſiring to try his Fortunes in the world, died in obſcurity. *Elizabeth* his eldeſt Daughter was married to Mr. *Thomas Burford*, an Apothecary in *Bath*, and Mayor of the City; and *Mary* his youngeſt Daughter died in her Virginity, before her Father.

The Doctor alſo living a ſtudious and ſedentary life, which might encourage his two grand diſtempers he laboured under, the Stone and [illegible] Gout, in the ſame year in which this Treatiſe was printed, to which he imparted his laſt breath, departed this life, in the great

Climacterical year of his Age 63. and of our Saviours Nativity, 1632. leaving behind him the name of a judicious, honeſt, and ſober Phyſitian, and the excellent example of a pious Chriſtian; on whom I ſhould have thought it no trouble to have ſpent more Ink, could my diligence which was not wanting in this thing, have procured me ſufficient information.

But κεῖται Πάτροκλος; the Doctor is dead, and this Child of his ſurvives the reſt, which happening to fall into my hands for a review, I could not but uſe it with all the tenderneſs and reſpect, confeſſedly due to the juſtly celebrated Off-ſpring of ſo deſerving a Parent, whom it ſo very much reſembles. And, I hope, as I have here done the Doctor right, ſo I have not elſewhere done his Diſcourſe any wrong, which I had ſome intentions at firſt to enlarge much more, but on ſecond thoughts I judged it more convenient, only to draw up a Table of the Minerals he mentions, with the addition of ſome few marginal Annotations, and to ſubjoyn the greateſt part of what I had to adde of mine own, by way of Appendix (though ſome things there are of a different nature from his deſign)

Which I intend hereafter, as opportunity ſhall ſerve, to augment and amplifie into an Hiſtory of *Bathe*. By the performance of which, though I ſhall not be ſo bold with ſome, on a more trivial account, to ſay, I ſhall oblige mankind; yet I think I may this, that I ſhall then, in any mans judgement, have done enough, to deſerve a Civil Reſpect, from the Place that is concern'd, ſuppoſing it now a ſufficient honour to bear up the Train of my Learned Predeceſſor.

T. G.

Libellum iſtum De Aquis Medicatis *a Doctiſſimo* Jordano *antiquiſſimo Collega noſtro ſcriptum multiplici eruditione & novarum ſubtilitatum varia ſupellectile refertiſſimum, legimus, & qui ab omnibus tam Philoſophis quam Medicis legatur digniſſimum judicavimus.*

JOHANNES ARGENT
Collegii Medicorum Londinenſium Præſidens.

JOHANNES GIFFORD.
SIMON BASKERVILLE.
THOMAS RIDGELEY.

In laudem operis.

PArve Alacri paſſu liber, Liber, ibis in orbem;
Denteſque ſpernes lividos.
Authores pandit, ſua dat Jordanus, *& uſu*
Quæſita multo protulit.
Aera qui totus, flammas meditatur, & undas,
Terram, metalla diſcuit.
Quicquid in his veteres, docuit quicquid Novus Author,
Celeri notavit pollice.
At ſua dum exponit, lucem dat, operta recludit,
Pennaque fertur libera.
Perge liber; gratus gratum volveris in ævum,
Lympha calentes dum fluent.

Ed. Lapworth, M. D.

In laudem Authoris.

NUmine divino Jordan *medicabile flumen*
Dicitur, è gelido licet illud frigore conſtet:
Tu Jordane *decus Medicorum, candide Doctor,*
Lumine divino gnarus diſcernere cauſas
Ægris corporibus noſti depellere morbos;
Intima ſecluſæ penetraſti viſcera terræ,
Thermarum vires aperis, reſeraſque metalla:
De gremio telluris aquas manare calentes
Qua ratione doces, nobis prius abdita pandis
Scrutando Phyſices arcana indagine mira,
Nec caperis fama, nec inane laudis amore,
Ut patriæ proſis, dignaris promere lucem:
Qui memoraverunt, vel qui modo Balnea tractant,
Non ſunt te melius meriti, vel judice Momo.

Jo. Dauntſey.

Ad Authorem.

SI fœlix, rerum potuit qui noſcere cauſas,
Inter fœlices tu prope primus eris.
Sunt,quæcunq; tulit vel terra, vel unda, vel aer,
Singula nota tibi, ſingula certa tibi.
Omnigenæ tibi vena reperta, reſecta metalli,
Nullaq; te in quovis corpore vena latet.
Non tu nominibus veterum terreris, ut umbris,
Nec tibi, ceu multis, quæ nova ſola placent.
Et docta & juſta ratione ſingula lance
Libras,, quæ veteres, quæq; tulere novi.
Nec cauſas tantum ſcrutans tu negligis uſum:
Utilis eſt liberi pagina quæque tui.
Hoc unum doleo, quod non ſint Anglica noſtra
Balnea, per calamum facta Latina tuum:
Creſceret ut gentis per te ſic gloria noſtræ
In longos celebris per loca cuncta dies.

COme hither Reader, bathe thy tender eyes
In *Jordans* ſtreams which out of *Bath* do riſe,
They'l clear thy ſight, and make thee clearly ſee
Choice ſecrets, which in earths deep boſom be
Cloſely laid up, and choicely ſecret kept,
Where unobſerv'd they many ages ſlept.
Here come & Bathe in *Jordans* ſtreams thy mind,
Thou there a ſtrange yet certain cure ſhalt find,
Of old ore-ſpreading errors leproſie,
Which theſe clear ſtreams do ſweetly mundifie.
Here are two miracles of nature met,
Here are two miracles of *England* ſet;

Our Engliſh Bathes, our Engliſh *Jordans* ſtreams
Are gathered here as natures choiceſt creams,
Produc'd by her, by learned Art refin'd
For th' univerſal good of humane kind.
May much good hence be rais'd, & may it raiſe
As well firſt Authors as Inventors praiſe.

Nicol. Stoughton, of *Stoughton*, Eſq;

BIS duas gandes numerare cauſas
(Nam tot Authores varii dederunt)
Unde Thermarum calor ortum haberet
(candide Doctor)
Tu tenax, nulla, tamen acquieſcis
Ex iis cauſis : mihi dic (amice)
Cur tibi ſoli via ſingularis
perplacet iſta ?
Arrogans forſan nimis ipſe multis
Qui viam linquis, videare, tritam :
Zoili & nigro vocitere vanus
ore Philautus.
Sed cui candor tuus innoteſcit,
Qui tuos mores bene novit ; is te
Litis oſorem vocet, & ſerenæ
pacis amantem.
Sint licet Plato Socrateſq; amici,
Tu licet doctos verearis omnes,
Veritas major tamen eſt amica,
quæ tibi cordi eſt.

Rob. Pierce Bach. in Theologia.

To the Author.

SHall I preſume to write in praiſe of him
Whoſe work hath taught the world more wit and Art;
And ſhall I not mine own diſpraiſe begin,
To undertake and cannot reach in part
His worth, his wit, his learning which confounds
Grave Antients in their long tradition grounds?

Celſus could brag *Homunculos* to make
Man to preſerve a thouſand years or more,
Yet on himſelf he did ſo much miſtake,
He could not hold his life till full threeſcore:
Before he made, his maker him did mar,
In this his words and works came ſhort by far.

But modeſt *Jorden* void of theſe conceits.
Hath clear'd obſcureſt points from darkneſs ſoul,
His learning, judgement, body, ſoul all waits
Life to preſerve in all; his lifes chief ſoul
Being learning, knowledge, and the love of truth,
He hath made men himſelf perpetual youth.
I. St.

AGes in former doubtfull errors night
From many worthy Stars have borrowed light,
Our Sun adorns our daies, whoſe radiant beams
No heat, but truth add to our bathing ſtreams.
A fit work for an Artiſt, whoſe pen bleeds
To death-receiv'd opinions: ſhews the ſeeds

Of earth-intombed Minerals, which lend
Heat by their birth to fountain Nymphs, who
Their pious tears in pity to regain (ſpend
Strength to the frozen nerves, ſweet eaſe from
pain.
Who would not ſtrive to celebrate that quill,
Which doth no fretting gall, but milk diſtill
To foſter truth; being ſo conciſe and terſe.
For to compriſe the Protean univerſe
In this ſmall volume: which who diſapprove,
Snarling expreſs neglect of lending love
To learning, tenant in this worthy pile,
Where natures works are poliſh'd by **Arts file.**
'Tis ſtrange in dayes of ruffling impudence,
Which pamphlets ſpue of faction fearing ſenſe,
Art ſhould be baſhfull; if you ſearch, you'l meet
It valid in each page, ſhrouded in each ſheet;
Aſham'd of their rude folly, whoſe mouths ſwell
To ſlander worth they nere ſhall parallel.
I'le venture natures tell-tale him to call,
And judge my verdict's not Apocryphall.
Heaven and earth ſeldom ſuch conceal'd births
ſteal,
But he the cauſe can publiſh, means reveal.
Take then a true ſurvey, his lines deſcry,
More truſted fables, then the truth did try;
And pay *Machaon* as a friendly fee
For purging of diſeas'd Philoſophy,
The tribute of thy praiſe, though folly fret,
Such as it made wiſe will repay the debt. (pains,
Purge foul mouths (Bathe) that all applaud his
Who purgeth bodies, and refines the brains.

Bartholomew Man.

On the Sight OF Dr. JORDEN'S Picture.

THis faint reſemblance *ſhews the Seat,*
Where once dwelt Art *and* Learning
Great ;
But vail'd *with ſuch a modeſt* Meen,
That 'twas not eaſie to be ſeen.
'Tis skill in Artiſts to conceal ;
The Load-ſtone's *ſtrongeſt* cap'd *with Steel:*
Thrice happy Painter, *and more, if*
Thine Art could lend him breath, *as* life.
That balks *with thine, all humane power*
If but requeſted for an hour.
'*Tis* he *that* Adam *made of* Duſt,
And Eve *out of his* Rib, *he muſt*
Inſpire Atomes, *by* his *might*,
Mans breath would ſcatter,not unite.
Yet a thing like him thou *haſt made,*
And we *as well as it, are* Shade.

T. GUIDOT.

OF Natural Bathes, AND Mineral Waters.

CHAP. I.

Explication of the word Bathe. *The ſcope and argument of this Book. The ancient uſe and eſteem of Bathes among the Romans. The modern uſe of them among the Turks. Of Medicinal Bathes, and Mineral Waters. How eſteemed by the Greeks, Latines, Arabians, and other Nations.*

THE word *Bathe* or *Balneum* is of larger extent then I purpoſe to diſcourſe of: for it being the name of a form of Remedy applyed to the Body, it may be framed either out of liquid things, or ſolid ſubſtances, or vapours.

Liquid Subſtances are Water, Milk, Muſt, Wine, Oyle: Solid Subſtances are Sand, Salt, preſſed Grapes, Corn, &c. Vapours are Stuphs and Hot Houſes.

My intent is only to treat of Waters, and principally of thoſe which be called Mineral, whether they be uſed in Bath or in Potion, &c.

Theſe kind of watry and vaporous Bathes have been in uſe from all antiquity, and held in great eſteem, both for pleaſure, and for preſervation of health. For there is no form of Remedy more comfortable to mans body, or which eaſeth pain and wearineſs more ſpeedily, and more effectually. And whereas *Hypocrates* commends thoſe Remedies which do cure *cito, tuto, & jucunde*, ſpeedily, ſafely, and with comfort; theſe Bathes perform all theſe intentions: and beſides, may be uſed to all Sexes and Ages, and Temperatures, without hurt or inconvenience, inſomuch as the antient Romans had them in very frequent uſe: their Diet being liberal, and upon variety of Meats, eſpecially upon Lettuce, Coleworts, Aſparagus, raw fruits, and ſuch like, which bred crude humours in their bodies, and had need of ſome ſuch help to digeſt them: as *Columella* ſaith, *Quotidianam cruditatem laconicis excoquimus*: we concoct our crudities by the uſe of Bathes. We read in *Plinie*, that *Agrippa* built in *Rome* 170 publick Bathes for common uſe, and *Pancirollus* tells us of 856 in *Rome* at one time, and all of them moſt ſumptuous and magnificent buildings, eſpecially the *Anthonin* and *Diocleſian* Bathes: the Walls whereof were of admirable height, with an infinite number of Marble Pillars,

De deperditis pag. 164.

lars; erected for oſtentation, and not to ſupport any thing, 1000 Seats to ſit in; Their *Caldaria, Tepidaria, Frigidaria,* moſt ſumptuous and ſtately: the whole fabrick ſo large and ſpacious, as they reſembled rather Cities than Houſes: And ſo it might well be, when as there were imployed for the building of the *Diocleſian* Bathes, as *Baccius* ſaith. 40000 men, but *Salmuth* ſaith, 140000 for ſome years together. They were placed where now the Church of Saint *Angelo* ſtands. The Turks at this day retain that antient cuſtome of the Romans, and are in nothing more profuſe, then in their Temples and Bathes, which are like unto great Pallaces, and in every City very frequent. And yet both the Romans and the Turks uſed thoſe Bathes chiefly for pleaſure and delicacy, and cleanlineſs: the Romans going bare-legged, and their wayes duſty, had need of often waſhing; and the Turks lying in their Cloaths, ſubject to Lice and Worms, if it were not for their often bathing.

Bellonius obſervat. lib 2. 3. c. 34
Proſper Alpinas de medicina Ægyptiorum.

Moreover, the Diet of the Turks, though it be more ſparing then that of the Romans, yet it is little better: namely, upon Herbs, Roots, raw fruit, &c. and their Drink, for the moſt part Water, being prohibited the uſe of Wine by their Religion, muſt needs breed many crudities in their bodies, yet by their often bathings, they do not only overcome them, but get a good habit of body, their Women being accounted as delicate creatures as any in the world, who duly twice a week reſort to the Bathes.

Now if thoſe Nations would beſtow ſo much upon their Bathes of delicacy and pleaſure, which were only of pure Water; we have much more reaſon to adorn our Mineral Bathes; which (beſides the former uſes) are alſo medicinal and very ſoveraign for many Diſeaſes, conſiſting of wholſome Minerals, and approved for many hundred years, of many who could not otherwiſe be recovered. At the leaſt wiſe if we do not beautifie and adorn them, yet we ſhould ſo accommodate them, as they might ſerve for the utmoſt extent of benefit to ſuch as need them.

For there is nothing in our Profeſſion of Phyſick more uſeful, nor in the works of Nature more admirable, (man only excepted, which *Plato* calls the great miracle) then Natural Bathes, and Mineral Waters. The nature and cauſes whereof have been ſo hard to diſcover, as our antient Authors have written little of them, holding them to be ſacred or holy, either for that they judged them to have their virtue immediately from God, or at leaſt from the celeſtial Bodies; from whence, both their actual heat was thought to be kindled, by lightnings or ſuch like impreſſions, and other admirable Virtues, and ſometimes contrary effects derived, which appear in them. Alſo divers miracles have been aſcribed unto thoſe Natural Bathes, to confirm the opinion of a ſupernatural power in them, as *Guaynerius* reports of the Bathes of *Aque* in *Italy*: and *Langius* out of *Athenæus*, concerning the Bathes of *Edepſus*, which both loſt their vertue for a time. The one by the Magiſtrates prohibiting poor diſeaſed people to uſe them, the other by impoſing a taxation upon them: but upon the reformation of thoſe abuſes

Cap. 2.
Epiſt. 53. *lib.* 2.

were reſtored to their former virtues again.

I need not herein averring the opinion of Divinity which was held to be in Bathes, make any mention of the Pool of *Betheſda*, written of by Saint *John*, and *Nonnus* the Poet; nor of the River *Jordan*, which cured *Naaman* the *Syrian* of his Leproſie, being indeed true miracles, and done by a ſupernatural power: yet it is likely that thoſe and ſuch like examples bred in the minds of men a reverend and divine opinion of all Bathes: eſpecially where they ſaw ſuch ſtrange effects as they could not well reduce to natural Cauſes.

And this hath been the cauſe that in old time theſe mineral fountains have been conſecrated unto certain Deities; as *Hamon* in *Lybia*, unto *Jupiter*: *Thermopilæ*, unto *Hercules*, by *Pallas*: among the *Troglodites*, another to the *Sun*, &c. And at this day we have divers Bathes which carry the names of the Sun, Moon, and Saints: and many Towns and Cities named from the Bathes in them: as *Thermæ* in *Macedonia* and *Sicily*, *Thermidea* in *Rhodes*, *Aquæ* in *Italy*, *Aquiſgraue* in *Germany*, *Baden* in *Helvetia*: and our antient City of *Bathe* in *Somerſet-ſhire*, in honor whereof I have eſpecially undertaken this labour, and I perſwade my ſelf, that among the infinite number of Bathes and Mineral Waters which are in Europe, there are none of more univerſal uſe for curing of Diſeaſes, nor any more commodious for entertainment of ſick perſons, then theſe are.

Beſides this ſacred conceit of Bathes, wherewith in antient times, the minds of men were poſſeſt, we may adde this, that the nature of Minerals was not ſo well diſcovered by them, as it hath been ſince: and therefore we finde very little written of this argument, either in *Ariſtotle* or *Hypocrates*, or in *Galen*, who wrote moſt copiouſly in all other points of Phyſick, yet concerning this hath little; * and never gave any of theſe waters to drink inwardly, although he acknowledgeth that they were in uſe: and for outward uſes, held them all to be potentially hot.

De tuenda ſanit. lib. 4. cap. 4.

*See the reaſon of this in *Iones* his *Bathes Aid*, fol. 7. b. where alſo he proves the inward uſe of Mineral waters among Phyſitians, as well before, as ſince the time of *Galen*.

After theſe Grecians, the antient Latines and Arabians ſucceeded *Plinie*, *Celſus*, *Seneca*, *Lucretius*, *Avicen*, *Rhaſis*, *Seraphio*, *Averrhoes*, in whom we finde ſome ſmall mention of natural Bathes, and ſome uſe of Salt and nitrous, and *Aluminous* waters, but nothing of worth towards the diſcoverie of the natural cauſes of them. It is likely they did paſs it over ſlightly, either by reaſon of the difficulty in ſearching out the cauſes of them, or that they judged them meerly metaphyſical. But in later times the nature and generation of minerals (from whence the Baths proceed, and from whence the whole doctrin of them both for their qualities and differences, originals and uſe, muſt be derived) being better looked into, and obſervations taken from ſuch as daily labour in the bowels of the earth, for the ſearch of Mines, or ſuch as afterwards prepare them for our neceſſary uſes; we have attained to better knowledge in this kinde, than the Antients could have, although in all new diſcoveries there will be defects for ſucceeding ages to ſupply, ſo it falls out in this: *Dies Diem docet: Alpham Beta* *ta corrigit.* And although *Agricola, Fallopius, Baccius, Matheſius, Solinander, Libavius,* &c. have added much unto that which was formerly known in this point, and reformed many errors and miſtakings in former writers: yet they have left many things imperfect, doubtful, obſcure, controverted, and perhaps falſe, as may appear in the diſcourſe following. I do reverence all their worths, as from whom I have learned many things, which elſe I could hardly have attained unto; and I acknowledg them to have been excellent inſtruments for the advancement of learning: yet I hope it may be as free for me without imputation of arrogancie to publiſh my conceits herein, as it hath been for them, or may be for any other:

Hanc veniam petimuſque damuſque viciſſim.
We both this leave, Give and receive.

My end and ſtudie is the common good, and the bettering of this knowledge: and if I ſhall bring any further light to increaſe that, I ſhall be glad: otherwiſe my intent being to ſearch out the truth, and not to contradict others, it will or ought to be a ſufficient protection for me, wherefore I come to diſcourſe of Mineral waters.

CHAP.

CHAP. II.

Definition of Mineral Waters. The nature whereof cannot be underſtood, except firſt conſideration be had concerning ſimple water. Of which in this Chapter are ſhewed the qualities and uſe.

Libavius de judicio aquarum miner. cap. 1.

M*Ineral waters are ſuch, as beſides their own ſimple nature, have received and imbibed ſome other qualitie or ſubſtance from Subterranean Mynes.* I ſay, *beſides their own nature,* becauſe they retain ſtill their liquidneſs and cold, and moyſture, although for a time they may be actually hot from an external impreſſion of heat, which being gone, they return to their former cold again. I ſay, *imbibed,* to diſtinguiſh them from confuſed waters: as earth may be confuſed with water, but not imbibed, and will ſink to the bottom again: whereas ſuch things as are imbibed, are ſo mixed with the water, as it retains them, and is united with it: being either Spirits, or diſſoluble juyces or tinctures; I ſay *from Subterranean Mynes,* to diſtinguiſh them from animal or vegetable ſubſtances, as infuſions or decoctions of herbs, fleſh, &c.

Seeing then that the Baſis of theſe Bathes or mineral fountains, is water, we muſt firſt conſider the nature of ſimple water, and from thence we ſhall better judge of Mineral Waters, and their differences.

Baccius lib. 1. cap. 6.

By ſimple water I do not mean the Element of water, for that is no where to be found among mixt bodies, but I mean ſuch water as is free from any heterogeneal admixture, which may alter either the touch or taſte, or colour, or ſmell, or weight, or conſiſtence, or any other qualitie, which may be diſcerned either by the ſenſes, or by the effects. This water therefore muſt have his proper colour and taſte, without ſavour or ſmell, thin, light, cold and moiſt; if any of theſe properties be wanting, or any redound, it is mixed and infected.

Solinander lib. 2. cap. 1.

Cold and moiſture do abound in water. For cold appears by this, that being heated by any external cauſe, it ſoon returns to his cold nature again, when the cauſe of the heat is removed. And whereas Air is held by the Stoicks to be moſt cold; and confirmed by *Seneca* and *Libavius*, yet the reaſon they give for it, doth ſeem to prove water to be more cold, becauſe they make the matter of air to be water, and to have his coldneſs from thence. But *Ariſtotle* holds the air to be hot from the efficient cauſe which rarified it, being of more validity to make it hot, than water (the material cauſe) to make it cold. *Galen* is of neither ſide, for he doth not judge it to be hot, neither doth he ever pronounce it to be cold: but by reaſon of his tenuity, apt to be altered either by heat or cold.

Solinander lib. 1. cap. 3.

Quæſt. nat. 2.

Libav. pyrotech. cap. 20.

Meteor 4.

De uſu partium lib. 8. cap. 3.

I will not here undertake to determine whether all be bred of water, or whether it be not a diſtinct ſubſtance of it ſelf, and only receiveth watry vapours into it, being agreeable in cold, moiſture, tenuity, &c. with it, and ſo lets them ſeparate in rain: and ſo exonerate it ſelf of theſe vapours, as alſo of dry exhalations by winds,

Daneus phiſ. Chriſt part 2. cap. 9.

Ariſtot. 1. Meteor cap. 4:

thunder, &c. or whether air be only the *effluvium* of the inferiour globe, being within the orbe of his virtue: as all Dominion hath not only a place of reſidence and Manſion, but alſo a verge and territory where it exerciſeth his authority and government; ſo the inferior globe of the earth, and water hath his dominion beyond his own globe, as likewiſe may be thought of all other globes of the Planets, &c. But theſe points are impertinent to my purpoſe. It is enough for me to ſhew what I judge of the temperature of the air concerning heat or cold. And to me it ſeems moſt probable, that the air of it ſelf ſhould be cold, as may appear by this, that it is only heated by external cauſes, which being removed, the air returns to his former coldneſs again. So we ſee that within the Tropicks in *Zona torrida*, as long as the Sun is within their Horizon, and beats the air with his perpendicular beams, it is exceeding hot, eſpecially in the vallies, where the reflection is moſt; inſomuch as *Ariſtotle* held thoſe parts of the World to be inhabitable, in regard of the extremity of heat. But after the Sun is ſet, the air returns to his natural coldneſs, until the Sun ariſe and heat it again. *Joſephus Acoſta* urgeth this argument againſt *Ariſtotle*, about the habitableneſs of the torrid Zone, that the daies and nights being there equal, the preſence of the Sun in the day-time may well heat the air, but his abſence for twelve hours more in the night, reduceth the air to a better temper: and upon this and divers other arguments and experiences, which cannot be denied, concludes, that if there be any Paradiſe upon earth, it is under or near the equinoctial. The like reaſon may be drawn from the coldneſs of mountains, which being near to the middle region of the air, and wanting that reflection of the beams of the Sun, which is in the valleys, are continually cold, and often covered with ſnow, which would not be if the air were hot. As for the conceit that the middle region is made cold by an Antiperiſtaſis, the element of fire being above it, and the reflection of the beams of the Sun beneath it, it is an idle conceit. For theſe heats on both ſides would rather heat than cool the middle region by their working upon it. Alſo take away the element of fire from under the Moon, which is an opinion now exploded by the beſt Philoſophers, and then what becomes of your Antiperiſtaſis? But I ſhall ſpeak more of this Antiperiſtaſis, *cap.* 13. And as for the reflection beneath, it is a weak thing, and will hardly extend to the top of a ſteeple: wherefore this coldneſs of the middle region is not from any Antiperiſtaſis, but from the nature of the air, which there is not altered either by any influence from above, or by any vapours or reflection from beneath.

Danæus Philoſ. Chriſt. p.2. c.8. Cardan. de ſubtil. lib.2. Valeſius contr. lib.1. cap. 5. Conradus Aſſachus de triplici cœlo lib.1. cap. 4. Laurent. Valla, &c.

Neither would it be ſo cold neer the Poles, if the air of it ſelf were hot. But the long abſence of the Sun in thoſe parts, and the oblique beams when it is preſent, do permit the air to enjoy his natural coldneſs. And as the air is of it ſelf, and in his own nature cold, ſo is it probable that it is more cold than water, ſeeing it hath a greater power of condenſation, than water, as we ſee it congeals water into ice, ſnow, hail, &c. which the water cannot do of it ſelf. For in the bowels of the earth, where the air cannot freely paſs, water is never found to be congealed, unleſs it be compaſſed by ſome other ſubſtance equivalent to air in coldneſs, as Quick-ſilver, Nitre, &c. where cold is drawn into a greater compendium, than in water, by reaſon of the denſity of their ſubſtances: and in ice and ſnow, the cold may be greater, by reaſon of the admixture of air. It is likewiſe probable that earth is more cold than water, if we conſider it as it is in it ſelf, and not mixed with other heterogenities. For as motion cauſeth heat, and levity, and rarity, ſo want of motion, which is in earth, cauſeth coldneſs, denſity, and ponderoſity. But it is enough for our purpoſe to prove both air and water to be cold. As for moiſture, *Ariſtotle* holds the air to be moſt moiſt, and water moſt cold. *Galen* holds water to be moſt moiſt. *Ariſtotles* reaſon for the predominance of moiſture in Air is, becauſe it is moſt hardly contained within his bounds: but the termination of things proceeds from their oppoſite qualities, as moiſture is terminated by dryneſs, and dryneſs by moiſture: and dryneſs doth as eaſily terminate moiſture, as moiſture doth terminate dryneſs. And this difficulty of termination in air, may more properly be aſcribed to his thinneſs and tenuity of parts, than to his moiſture. For dry exhalations will extend themſelves as well as moiſt vapours; and as it is denſity that compacts, ſo it is rarity that extends. Fire it ſelf is more hardly bounded than air, and yet not moiſt. Thoſe that would reconcile theſe differences, do alledge that *Galen* ſpeaks as a Phyſitian, and meant that water was *humidiſſimum medicamentum*:

Ariſt. 1. Meteor. cap. 3.

De ortu & inter. lib. 2. & meteor. 4. cap. 1. & 4. Gal. de ſimpl. med. fac. lib. 1. cap. 8. Item de Elementis 1.

Valeſius cont. lib. 1. cap. 2.

dicamentum : *Ariſtotle* as a Philoſopher meant it to be *humidiſſimum elementum*. But this reconciliation gives little ſatisfaction. For how the could water be *humidiſſimum medicamentum*, if it were not *humidiſſimum elementum?* For the ſimple qualities are more intenſe in the Elements, then in mixt Bodies, *cæteris paribus*. We ſpeake of the proper operation of water according to his natural quality, and not as it may work by accident. Thinneſs and levity are two other qualities of ſimple water, which *Hypocrates* commends, and adds this experiment in another place, that it is quickly hot and quickly cold. *Galen* adds another experiment in the quick boyling of Peaſon and Beans.

De aere, aquis & locis.

De morbis popular. lib. 2. ſect. 2.

And whereas *Galen* produceth the boyling of Beans as a familiar example to ſhew the tenuity of water, we may gather that the uſe of Beans was common in thoſe dayes, although the Pythagorean ſect did then much flouriſh, which were thought to forbid the uſe of them. But I find that here hath been a great miſtake, For *Ariſtoxenus* who wrote of the Life and Doctrine of *Pythagoras*, affirms that he did delight much in that kind of food: and our Phyſitians commend them for looſing the Belly, and drying of Rheums. But it ſeems the cauſe of this miſtake was a Verſe of *Empedocles*,

Bruerinus de re cibaria.

Platerus in praxi.

Δειλοὶ πάνδειλοι κυάμων ἄπο χεῖρας ἔχεσθαι,

O miſeri a fabulo miſeri ſubducite dextras.

Thrice wretched men, from Cyams keep your hands.

As if he had forbidden the uſe of Beans, a poor occaſion to pronounce them miſerable which uſed them. But he meant it of continency and abſtinence from venery, as *Aulus Gellius* doth interpret it: where *κυάμοι* are underſtood to be *teſticuli*. *Cicero* mentioneth the the ſame of the Pythagoreans, but in another ſenſe, becauſe Beans were thought by their flatulency, to diſturb our Dreams, and ſo to hinder the divination which might be gathered from them, as alſo *Middendorpius* judgeth: But to return to water: And it is requiſite that water ſhould have theſe qualities, in regard of the manifold and neceſſary uſes of it, both for Man and Beaſt, and Plants: inſomuch, as there is no living for any creature, where there is no water. It was our firſt drink to quench our thirſt, and to diſtribute our nouriſhment as a *vehiculum*, which it doth by his tenuitie; and after the invention of Wine, it was mixed therewith, as *Virgil* ſaith of *Bacchus*,

Noct. Attic. lib.4.cap.11. de Divinat. 1. In Ariſtæum quæſtione 19.

Brerinus de re cibaria lib. 16. cap. 17.

Poculaque inventis Acheloia miſcuit uvis,

And he that firſt found out the Vine,
Mix'd ſome Water with his Wine.

Where, by *Acheloia*, he means not only the water of the River *Achelous* in *Etolia*, but all other waters, as *Macrobius* proves out of *Ariſtophanes* and *Ephorus*: and *Scaliger* ſaith that the Greeks called all waters by that name, from the word λέγω: And ſince the planting of Vineyards, ſeeing all Countries could not bear

Saturnal. lib.5. cap. 18.

Grapes, *Bacchus* alſo taught the world to make *vinum è frugibus* with water, as *Diodorus Siculus* reports, from whence the Egyptians had their *Zithum* and *Curmi*, the Spaniards their *Cerea*, the Turks their *Cowſet*, and we our *Ale* and *Beer*; all which are extracted out of Corn, by the pureneſs of and tenuitie of water. By means whereof we have our Broths, Syrups, Apozemes, &c. extracted with it, as a fit menſtruum to receive the faculties of all medicaments and nouriſhments, eſpecially the ſecond qualities, and therefore it was antiently called *Panſpermia*: beſides the manifold uſes in waſhing, dying, &c. where that water is accounted beſt, which lathers moſt, being mix'd with Soap, of which I will not diſcourſe farther. Levity is another note of pure water, alledged by many, and ſerves well to diſtinguiſh it from many mixed waters, whether we reſpect the weight of it, or the moleſtation which it breeds in the bowels. This difference of weight is hardly diſcerned by ballance, both becauſe ſimple waters do very little differ in this point, and alſo many mixt waters, if they be only infected with Spirits, and not corporal ſubſtances, retain the ſame proportion of heavineſs with ſimple water: and alſo becauſe it is hard to have great Ballances ſo exact, as a ſmall difference may be diſcerned by them, yet *Agricola* reports that a cotyle of the water of Pyrene and Euleus, did weigh a dram leſs then the water of Euphrates, or Tigris, and therefore the Kings of *Perſia* uſed to drink of it, and held it in great account, as alſo the water of the River *Coaſpis*. Thus much for

Rerum antiquar. li.4.c.12.

Baccius l. 1.c.7.

De nat. eor. quæ effl. è terra li.1. cap. 15.

Langius Epiſt. lib. 1. Epiſt. 31.

for the qualities which ſimple water ſhould have; for ſuch as it ſhould not have, I ſhall not need to ſpend time in diſcourſe, being either ſuch as the Senſes will diſcover, if it be in taſte, colour, ſmell, or touch; or the effects, if it be purgative, vomitory, venomous, &c.

CHAP. III.

Of the three Originals of Simple Waters.

Baccius lib. 1. cap. 3. 4. Agric. de ortu & cauſis ſubter. lib. 1. cap. 1, 2, 3, 4, 5, 6, 7, 8, 9. Solinander l. 2. cap. 1. & lib. 2. cap. 3.

NOW it followeth that we ſhew from whence theſe waters have their Original, which is no other then of the mixt waters, ſaving that the mixt waters do participate with ſome Minerals which are imbibed in them.

They haue three ſeveral Originals: the one from moiſt vapours congealed by cold in the air: the ſecond from the earth; the third by percolation from the Sea.

1 From the Air.

For the firſt, it is certain that our Springs and Rivers do receive great ſupply of waters from the Air, where vapours being congealed by cold, do fall down upon the Earth, in Rain, or Snow, or Hail, whereby the ground is not only made fertile, but our Springs are revived, and our Rivers increaſed. As we ſee the Rhine and Danubius to ſwell more in Summer than in Winter, becauſe then the Snow which continually lyeth upon the Alpes, doth melt by the heat of the Sun, and fills thoſe Rivers, which have their Originals from thence up to the brinks. Alſo we ſee daily after much Rain, our ſmall Lakes and Rivers to be very high. Alſo upon much dryth our Springs fail us in many places, which upon ſtore of Rain do ſupply us again with water. And this is the cauſe that in moſt parts of *Africa*, near the Equinoctial, where it rains little, they have little water; and many times in two or three dayes journey, can hardly find to quench their thirſts and their Camels. *Leo Africanus* ſpeaks of an Army wherein were many Camels, which in their marching, coming to a River, (perhaps it was but a Brook) did drink it dry. So that we muſt acknowledge that the Earth receives much water this way. But how this ſhould ſerve the Bowels of the Earth with ſufficient for the generations there, and for perpetual Springs, is very doubtfull; whereas *Seneca* ſaith that theſe waters do not pierce above ten foot into the Earth: neither if there were paſſages for it into the Bowels of the Earth, can the hundred part of it be imployed this way, but is readily conveyed by Rivers into the Sea. Wherefore although much water be yielded to the ſuperficies of the Earth by Rain and Snow, and Hail from the Air, yet not ſufficient to maintain perpetual Springs; ſeeing many times, and in many Countries theſe aerial ſupplies are wanting, or very ſpare, and yet the Springs the ſame. Wherefore *Ariſtotle* his opinion, which attributes all to aerial water and vapours from thence, is juſtly rejected by *Agricola*, and by our Countrey-man Mr. *Lydiat*. So that we muſt find out ſome other Originals, or elſe we ſhall want water for the manifold uſes the Earth hath of it. From the Earth they make another Original of

Quæſt. natur. lib. 3. cap. 7.

2 Meteorol. & 1. 3.

De ortu & cauſis ſubt. l. 1. c. 6.

De orig. font. cap. 1.

2. From the Earth. perpetual Springs and Rivers, ſeeing the firſt ſeems to be ordained by Nature only for the irrigation of the ſuperficies of the Earth, which elſe would be in moſt places deſtitute of water, where Springs are not; and ſo would be barren, Plants and Trees wanting due moiſture for their nouriſhment. Wherefore for the perpetuity of Fountains, and for ſubterranean generations, which cannot proceed without water, they have imagined a generation of water within the Earth; ſome holding that the Earth it ſelf is converted into water, as Elements are held to be mutable and convertible, the one in the other. As *Ovid* ſaith of the converſion of Elements:

Reſolutaque tellus,
In liquidas rareſcit aquas, &c.

The Earth likewiſe, when once unty'd
Is into Water rarify'd.

Metam. 15. But we muſt grant *Ovid* his Poetical liberty, and not tye his words to ſuch a ſtrict ſenſe, although *Scaliger* in his Criticks would not pardon a Philoſophical errour in the firſt verſe of his Metamorphoſis, for ſaying that forms are changed into new bodies. But unleſs there be ſome reciprocation between water and air, the other Elements are not convertible the one into the other. For neither Fire will be converted into any other Element being ſuperiour to the reſt, and not to be maſtered by cold, which only muſt be the agent of the converſion of it by condenſation: neither will the earth be converted into water, or any other Element, as *Plato* thinks in *Timæo*, and *Ariſtotle 3. de cœlo cap. 7.* for either heat or cold muſt convert it. Heat cannot do it, although it rarifie and attenuate, both for that it conſumes moyſture, and alſo becauſe water is cold, which it ſhould not be, if it were made by heat; for every natural Agent works to that end that it may make the Patient like it ſelf: and heat may convert earth into fume and dry exhalations, but not into water, for all water which is not eternal, is from cold; likewiſe cold cannot convert earth into water, becauſe cold doth congeal, condenſe, and congregate, and indurate, and not diſſolve and attenuate, &c. as we ſee in Amber and Gumms. Neither will water be converted into earth. For by heat it turns to vapour and air, by cold into ice and ſtone; wherefore the Elements are not changed the one into the other, unleſs it be water and air, which have more affinity and more neighborhood than the reſt. And yet it is doubtfull, as I have ſaid in the former Chapter: but this generation of water from the earth is impoſſible. Others will have great receptacles of air within the earth, which flying up and down, is congealed by the coldneſs of Rocks into water, to ſupply all wants. Others imagine huge Lakes and Ciſterns, primarily framed in the earth, and ſupplyed with water, either from vapour or air, or from the ſea; which water either by agitation, by winds, or by impulſion from the Sea, or by compreſſion of Rocks, is elevated to the ſuperficies of the earth: or elſe vapours from thence, made by attenuation, either

Ariſtotel. 4. meteor. cap. 10. & ultimo.

Valeſius de ſacra Philoſoph. paſſim.

from the Sun and Starrs, or from ſubterranean fire kindled upon Sulphur and Bitumen; which vapours aſcending to the tops of Mountains, are there congealed into water by the coldneſs of the Rocks; where there muſt be other Ciſterns or Caſtles in the air to feed the Inferiour Springs. Others will make the earth to be an animal, and to ſuck water by veins, to ſerve his turn for generations and nutritions. But why ſhould it ſuck more than it hath need of? and how ſhall it caſt it forth beyond the place of uſe, to the ſuperficies of the earth? unleſs they will ſay that the Mynes which ſuck it, do puke it up as Infants do when their ſtomachs are full, which is abſurd to ſay. Theſe and ſuch like devices are produced for the maintaining of their Original; which as they are all inſufficient to afford ſuch a proportion of water as is requiſite, ſo moſt of them are ſo improbable, and full of deſperate difficulties, as I am unwilling to ſpend time in the rehearſing of them, or their Authors, much more unwilling in the confuting of them, to trouble my ſelf, and offend my Reader, only the point of ſubterranean fire which hath taken deepeſt impreſſion in moſt mens minds, I ſhall ſpeak of hereafter, when I come to ſhew the cauſes of the actual heat of Springs. The third Original is from the Sea, a ſufficient ſtorehouſe for all uſes, and whereunto the other two may be referred. For that which falls from the air, and that which is bred in the earth, do proceed principally from the Sea. *Agricola* for fear of wanting water for his Springs, is contented to admit of all theſe Originals, although he relyeth leaſt

3 From the Sea.

De ortu & cauſis ſubter. lib. 1. *cap.* 5. & 9.

leaſt upon the Sea, becauſe he knows not how to bring it up to the heads of his fountains, but is contented it ſhould ſerve for lower places near the Sea-coſt. As I remember I have ſeen in *Zerland* at *Weſtcapell*, freſh Springs colated from the Sea, through banks of ſand. But I make no doubt but that the Sea-water may ſerve all other Springs and Rivers whatſoever, although both far remote from the Sea, and high in ſituation. Neither ſhall we need to flye for help to thoſe monſtrous conceits of Agitation, Compulſion, Compreſſion, Suction, Attraction by the Sun, &c. But holding the ſacred Canon of the Scriptures, that all Rivers are from the Sea, &c. I perſwade my ſelf, that there is a natural reaſon for the elevating of theſe waters unto the heads of Fountains and Rivers, although it hath not yet been diſcovered. For thoſe opinions formerly mentioned, will not hold water.

Eccleſiaſtes 1.

My conceit therefore is this, that as we ſee in *Siphunculis*, that water being put in at one end, will riſe up in the other pipe, as high as the level of the water (whether by his weight, or by the correſpondence with his level, I will not diſpute) ſo it may be in the bowels of the earth; conſidering that the paſſages there are more firm to maintain the continuitie of the water with the Sea, than any leaden pipes can be, being compaſſed on every ſide with many Rocks: as we ſee in *Venis, fibris & commiſſuris ſaxorum*. Now although perhaps this water enters into the earth very deep, yet the level of it muſt anſwer to the ſuperficies of the Sea, which is likely to be as high as the ſuperficies of the Land, ſeeing the

Ariſt. Meteorol. cap. ultimo lib. 1

the natural place of waters is above the earth. And although neer the Coaſts it be depreſſed and lower than the Shore, yet there is reaſon for that, becauſe it is terminated by the dry and ſolid body of the earth; as we ſee in a cup or bowl of water filled to the top, we may put in a great bulk of ſilver in pieces, and yet it will not run over, but be heightened above the brims of the bowl. The like we ſee in a drop of water put upon a Table, where the edges or extremities of the water being terminated by the dry ſubſtance of the Table, are depreſſed, and lower than the middle, like a half globe: but take away the termination by moiſtening the Table, and the drop ſinks. * If this be evident in ſo ſmall a proportion, we may imagine it to be much more in the vaſt Ocean: and our Springs being commonly at the foot of Hills, may well be inferior to the Globe of the Sea, if any be higher, they may perhaps be fed from rain and ſnow falling upon the Mountains. But if *Joſephus Acoſta*, his aſſertion be true, that the Sea towards the Equinoctial, is higher than towards the Poles, then the level of the Sea may be much higher than the top of our higheſt Hills, but this is a doubtful aſſertion: yet I dare believe, that if it were poſſible to immure a Spring without admiſſion of air, which might break the continuitie with the Sea, our Springs might be raiſed much higher. At Saint *Winifrids* Well in Flint-ſhire, though there be no high land neer it, yet the Springs riſe with ſuch a violence, and ſo plentifully, that within a ſtones caſt, it drives a Mill. It is likely that this Spring might be raiſed much higher. And whereas we ſee that Rivers do

*This way of arguing is queſtioned by Dr. *French*, who ſuppoſeth the many great Rivers terminated in the Sea to be a ſufficient moiſture for the taking away the termination of the water made by the dryneſs of the earth, and ſo to make the globous Sea ſink to an evenneſs. *vid. French Yorkſh.* Spaw. p. 10, 11, 12.

do run downwards to the Sea *per decliue*, it doth not prove the Sea to be lower than the Land, but only near the ſhore where it is terminated, and in lieu of this it hath ſcope aſſigned it to fill up the Globe, and ſo to be as high as the Land, if not higher. For if a meaſure ſhould be taken of the Globe of the earth, it muſt be taken from the tops of the Mountains, and from the higheſt of the Sea, and not from the Valleys, nor from the Sea-coaſts. This conceit of mine I was fearful to publiſh, and therefore had written unto Maſter *Brigges*, mine antient friend, for his advice in it, being a point wherein he was well ſtudied: but before my Letter came to *Oxford*, he was dead. But now I have adventured to publiſh it, to ſtir up others to ſearch out the cauſes hereof, better than hath yet been diſcovered.

Exors ipſe ſecandi, fungor vice cotis.

Anothers edge, though blunt, I ſet,
And with the Stone that's dull, I whet.

CHAP. IV.

Diviſion of Mineral Waters. Minerals deſcribed. Their kinds recited. Of Earth, ſimple and mixed. Whether it give any medicinable qualitie to Water. And ſo of the reſt in the following Chapters.

THus much of ſimple waters, and their originals, which may ſerve as *Polycletus* his rule to judge mixed and infected waters by: as *Galen* in many places ſpeaks of an exact and ſound conſtitution of body, as a rule to diſcern diſtempered and diſproportionated bodies. And thus much in explication of the *Genus*, in the definition of Mineral Waters.

Now I come to Mineral Waters, and to the other part of the definition which we call difference, &c. from Subterranean Mynes by Imbibition.

Theſe Mineral waters are either ſimple or compound; ſimple, which partake but with ſome one Subterranean Mineral; compound, which partake with more than one. And theſe waters partake with Minerals, either as they are confuſed with them, or as they are perfectly mixed. Alſo theſe mineral waters, whether ſimple or compound, are actually either hot or cold; the reaſon whereof muſt proceed from ſome Subterranean cauſe, as ſhall be ſhewed hereafter.

Wherefore we muſt firſt know the nature of theſe Subterranean Minerals, and their generation

A
TABLE
OF
MINERALS,
WITH THEIR
QVALITIES.

erals
ither

- 1. Earth.
  - Simple, Dry, Cold, Aſtringent
  - or mixed with
    - Nitre
      - Fullers Earth
      - Marle
      - Abſtergent.
    - Allum
    - Coperas
      - All ſorts of Boles, Aſtringent and Deſiccative.
    - Turfe
    - Bitumen, Peat, &c.
      - Fat, and Unctuous.
  - Vid. p. 24, 25, 26.
- 2. Stone, vid.p. 27.
- 3. Bitumina.
  - Solid
    - Terra Ampelis.
    - Succinum.
    - Gagates.
    - Ambra
    - Camphora
      - Borneo.
      - China.
    - Tithantrax, ſive Carbo foſſilis.
  - Liquid
    - Petroleum.
    - Naphtha.
  - Potentially Hot and Dry, in the 2. or 3. Degree; Except Camphir, concerning the Nature and Qualities of which Authors diſagree, Vid. pag. 34.
- 4. Concrete Juyces.
  - Salt, Aſtringent, Detergent, Purging, &c. Vid. pag. 47.
  - Nitre.
    - Sal Ammoniacum.
    - Borax.
    - Altincar.
    - Vid. pag. 44. 51.
  - Allum.
  - Vitriol.
    - Very aſtringent, and cold, Vid. p. 57, 58.
- 5. Spirits.
  - Quickſilver; Various in its Qualities, vid.p. 61, 62.
  - Sulphur; Moderately Hot and Dry, and ſomewhat Cooling, vid. p. 63.
  - Arſenick
    - *Auripigmentum*,
    - *Riſagalum*,
    - *Sandaracha*,
    - *Ruſma*, &c.
    - Venomous, vid. p. 65.
    - Extreme hot and putrifying, p. 66.
  - Cadmia
    - Natural, Liquid, Dangerous, and a ſtrong Corroſive,
    - Factitious, Moderately, hot and cleanſing,
    - vid. p. 66.
- 6. Mean, or half Metals; as
  - *Biſmutum*, or Tin-glaſs; Qualities not mentioned, vid. p. 67.
  - *Antimony*, purgeth violently upward and downward, ib.
  - Bell-metall, not uſed in Phyſick, vid. p. 68.
- 7. Metals
  - Perfect
    - Gold, Qualities uncertain, vid. p. 69. & 72.
    - Silver, Eſteemed Cold, Dry, Aſtringent, Emollient, vid p. 69. & 74.
  - Imperfect
    - Hard
      - Iron, Opening and Aſtringent, vid. p. 70. 74, 75, 76.
      - Copper, Temperate in heat, leſs Aſtringent, and more cleanſing than Iron, vid. p. 70. 77.
    - Soft
      - Tinn, Cold and Dry, yet moving Sweat, p. 72. 77. 78.
      - Lead, Coldand Dry, vid. p. 72. 78. & 79.

Place this between page 24 and 25, where the 4th. Chapter of Minerals begins.

on, from whence Mineral waters receive their difference, from common ſimple water, before we can judge of the nature and quality of them, either Actual or Potential.

By Minerals, we underſtand all inanimate perfect bodies bred in Mines within the bowels of the earth. I dare not undertake to muſter theſe in due order by Dichotomies, ſeeing neither *Agricola* nor *Fallopius*, nor *Libavius*, nor any other that I know, have exactly done it, nor ſatisfied either others or themſelves in it: and ſeeing there are divers Minerals lately diſcovered, and perhaps more may be hereafter, which have not been known in former times, and therefore not mentioned; as *Calaem* in the Eaſt-Indies, *Ruſma* and *Terra ghetta* in Turkey, &c. Wherefore I will make bold to reckon them up as they come to hand in ſeven ranks.

Minerals reduced to ſeven heads.

The firſt ſhall be earth.

Earth.

Earth, whether it be bred *ab exhalatione ſicca refrigerata*, or *ex miſtis per putredinem in fimum converſis*, or *ex lapidibus ſole aut calore coctis, & deinde aqua ſolutis, &c.* It is all inconcrete. As a little water gleweth it together in *Lutum*, ſo a great deal diſſolves it. But this is no proper diſſolution, but only a disjoyning of parts by Imbibing the moiſture which conjoyned them into a greater proportion of water; for waters do naturally run together, like drops of quick-ſilver, or melted metal. Wherefore ſeeing the moiſture which is in the earth, is not natural, but adventitious, not united eſſentially, but only mixed accidentally, it may well be called an *inconcrete* ſubſtance, whoſe moiſture is eaſily drawn from it, being ready to unite it ſelf with other moiſture, and leave his old body as it found it, that is, duſt: yet ſo as that water retains with it ſome taſte or qualitie which it received from the earth. This duſt is neither a ſimple body, as Elements are, nor permanent in one and the ſame kind: but as it is thought to participate with *animales vegetables*, and minerals, ſo to be tranſmuted into any of them, being both Mother and Nurſe to all terreſtrial bodies.

Agric. de nat. foſſil. lib. 1. cap. 4.

Simple earth, if it be not mixed with other ſubſtances, is dry and cold, and Aſtringent. But if it be mixed, as commonly it is, it altereth his qualitie according to the mixture. Mine intent is to write of it as it is ſimple, and ſo of the reſt.

Simple earth yields but a muddie water of it ſelf, and of no uſe in Phyſick, but if it be mixed with other Minerals, it makes the water to participate with the qualitie of thoſe Minerals alſo. As if it be mixed with Nitre, as in Fullers earth and Marle, it makes the water abſtergent like ſoap. If with Allum or Copperaſs, aſtringent and more deſiccative, as in all ſorts of Boles. If with Bitumen, fattie and Unctuous, as in Turf and Peate, &c. We have divers examples of all ſorts. The Bath of Mount *Othon* in *Italy* is full of clay, which is a kind of Bole. The Bath Caldaria, full of Ocre. The Bath of Saint *Peter* full of a yellow earth, tincted belike with ſome other Minerals. Wherefore theſe are to be judged of according to the ſeveral Minerals which they contain. But ſeeing earth it ſelf makes little impreſſion into water, neither do we make any Phyſical

Baccius lib. 5. cap. 1.

ſical uſe of waters, which contain nothing but earth, I need not ſpend any time about them.

CHAP. V.

Of Stone.

THe ſecond ſhall be Stone. Stone is another Mineral ſubſtance, concrete and more heavy than earth, and our Mineral men confound themſelves much in the definition of it. Wherefore *Fallopius* implores the help of *Marcus Antonius Janna* about it, as one of the moſt difficult points in Philoſophie: but in the end, defines it *by his want of diſſolution, either by heat or moyſture.* And whereas it is manifeſt that ſome ſtones will melt, he imputes it to the admixture of ſome metal, among which he reckoneth glaſs. Others define it by his hardneſs, wherein commonly it goeth beyond others Minerals. But you ſhall have ſome ſtones ſofter than ſome of thoſe, and therefore the definition is not good. Others by this, *that being broken or calcin'd, they will not be conſolidated again into their former conſiſtence or ſhape.* But for breaking, the reaſon of that, is want of fuſion; for without fuſion or ignition, which is a kind or degree of fuſion, Metals alſo being broken, will not be conſolidated into the ſame Maſſe again. And there is no more difference in nature or eſſence, between a whole ſtone and a broken, than there is between a maſs of Metal, and the powder or filings of the ſame. As for calcination, other minerals may be ſo far calcin'd,

De metallis cap. 6.

calcin'd, and brought to a Crocus by fire, as they will be irreducible, therefore this is not proper to ſtone. Wherefore I am of *Fallopius* his opinion in this point, and the rather becauſe otherwiſe there would ſeem to be a ſpecies in nature wanting, if there were not Mineral Species wanting, diſſolution by heat or moyſture, as well as there are, having ſuch diſſolution. And this *vacuum* which nature abhors, is not only to be underſtood of a local vacuity, but alſo of a want of ſuch ſpecies as are in natures power to produce, for the ornament of the World. For if it be a natural paſſion to be diſſolved, it is likewiſe a natural paſſion not to be diſſolved: and if ſome things will be diſſolved both by heat and moyſture, as Salts, why ſhould there not be other ſubſtances which will be diſſolved by neither of them. And this muſt be ſtone, for nature affords none other. Moreover, according to *Ariſtotle*: *Quæ concreverunt a frigido & a calido, a nullo iſtorum diſſolvuntur*; Thoſe things which come together by heat or cold, are diſſolved by neither of them: Of this kind are ſtones which could never attain to ſuch purity as many of them have, if they were not congealed by heat as well as by cold. Alſo under what ſpecies ſhall we comprehend Diamonds, Talcum, black-Lead, which ſome think to be *pnigitis*, *Magnetis*, *Glymmer*, *Katzenſilber*, *pyrimachus*, *amiantus*, *alumen plumoſum*, *ſaxum arenarium mortuum*, &c. if not among Stones? yet theſe are confeſſed to be invincible by fire or water. Alſo all pretious Stones, the more noble and pretious they are, the more they reſiſt diſſolution either by fire or water: for this quality ſheweth the perfection of their mixture. True it is that ſome ſtones will be diſſolved by fire or water, and therefore *Pliny* and *Agricola* divide Stones into fuſible and infuſible: but this is in regard of other ſubſtances bred in the ſtone; which if it be Metal, the fuſion will be Metalline: If Nitre or mean Minerals, it will be Vitrificatory. As *Pliny* reports of the invention of Glaſs by certain Merchants, who melting Nitre upon the Sand in *Syria*, where with Clods of Nitre they had made a Furnace for their neceſſary uſe; found that clear Metal which we call Glaſs, *Ecce liquato nitro cum arenis viſi ſunt rivi fluxiſſe nobilis liquoris.* Behold, with the Sand, when the Nitre was melted, ran ſtreams of a noble liquor.

If Sulphur, as in *Pyrite*, it will likewiſe melt and ſtrike fire. And whereas the ſtriking of fire out of a flint or Pyrites, or any other thing that will ſtrike fire, is held by all men to proceed from the kindling of air, by the colliſion of two hard ſubſtances together, they are miſtaken. For then Diamonds, Chryſtal Glaſs, &c. ſhould ſtrike fire as well as flints; but it is the Sulphur contained in them; And *G. Fabricius* in his obſervations, although he obſerves not the reaſon of this fire, yet he confeſſeth that out of any Pyrites *è quo excutitur ignis, etiam excoquitur ſulphur*; Out of which fire is ſtruck, Sulphur alſo is to be had. *Pliny* gives the reaſon of the name, *quia ineſt illi ignis*; Becauſe fire is in it. The like we obſerve in *Indian* Canes, and ſome Woods that are unctuous, and full of Oyle, which yield fire by frication, or

colliſion,

Verulamius de vita & morte, pag. 418. & 453.

collision, not by kindling the air thereby, but inflamable Oyle in them. For air being cold and moiſt, as hath been proved before, hath no agreement with fire, no more then oyle hath with water. And therefore flame is not the kindling of air (*flamma non eſt aer accenſus*) but of fuliginous vapours, which have ſome unctuouſneſs in them,and ariſe from the mater of fewel,and have ſome inflamable parts remaining in them: which neer unto the matter of fuel, do cauſe a manifeſt flame: but farther off,no flame doth appear: yet ſo as if you hold Flax near unto the flame,though it touch it not, yet it will kindle, by reaſon the fire extends further then it is viſible,being a pellucide and tranſparent body,and thinner then the air it ſelf. And this is held to be the cauſe why it is not viſible under the Moon. And whereas without air fire goes out, and is extinguiſhed, the reaſon is, becauſe the fuliginous vapours wanting evaporation, do recoyle upon the fire and choak it. This is evident in cupping-glaſſes, and in making of Char-coal: where if the air be altogether excluded, the fire goes out; if but in part, then although the flaming be hindred, yet the fire doth penetrate the fewel, and ſo converts it to coals: which by reaſon of the fuliginous vapours, are commonly black. *Bellonius* ſaith that Char-coals made of the wood of the Oxycedar tree, are white; which muſt be aſcribed as I think, to the ſmall quantity of fuliginous vapours which that wood doth yield: or elſe that thoſe vapours are rather ſulphurous, then of any other combuſtible ſubſtance. As wee ſee that Tinby Coals will not black linnen, being

De neglecta ſtirpium culturâ problem. 13.

hanged in the ſmoak of them, but rather whiten it, by reaſon of the drying and penetrating quality of Sulphur, which will make red Roſes white.

But what ſhall we judge of thoſe Lamps, which have been found burning in old Sepulchres? ſome of them (if we may believe Hiſtories) having continued 1500 years together, as that which was found in *Paulus* the third his time, of *Tullia, Ciceroes* Daughter: and another of *Maximus Olibius*, near unto *Padua*, as *Bernardinus Scardeo* reports. It ſeems here was no air to maintain the Lamps, being cloſely ſhut up in glaſſes, and therefore they burnt without air, and were not extinguiſhed, by reaſon they bred no fuliginous vapours to choak them.

Now whether theſe Oyles which fed the Lamps were made by Art out of Gold, as ſome think, and I hardly believe, or rather out of ſome pure kind of Naphtha, which is moſt probable, I leave to others to judge: only I judge it to be the purity of that Oyle, which yielded no fuliginous vapours to choak the fire. If air had maintained the flame, it had not continued two minutes, for it would have been ſpent and waſted by the fire. Wherefore *ignis non eſt aer accenſus.* If other concrete juice be mixed with Stone, as Salt, Allum, Vitriol, &c. it makes them to relent in water or moiſt air; and theſe Stones are never good to build withal. But let us take Stone as it is in it ſelf, without the admixture of other Minerals, and we ſhall find it to be indiſſoluble and invincible, either by fire or water.

Eraſtus diſput. part. 2. p. 105.

Metallurgians, Refiners, and Aſſay Maſters, may make uſe of this for their Shribs, Tiegles, Muffels, Copels, Teſts, Hearths, Crucibles, Furnaces, &c. where they deſire a defenſible ſubſtance againſt fire. But it requires a preparation to cleer it from all combuſtible and diſſoluble admixture; as they may eaſily do, after they have powdred their Stone, to calcyne it and waſh it well. This work being often repeated, will make it fit for their purpoſe: and they may uſe it either alone in the ſame manner as they do bone-aſhes, or they may mix it with their lome, brick-duſt, geſtube, &c. Alſo they may make Bricks of it for their Furnaces, which will hardly receive any injury from fire. Talcum alſo is a Stone invincible of it ſelf by fire: and Bricks made of Clay that is full of it, as the *Guendern* Clay in *Cornwall*, will hardly melt with any heat. Stones are naturally dry and cold, and aſtringent like a concrete earth.

Simple Stones which have no other Minerals mixed with them, and are come to their perfection, being indiſſoluble, either by fire or water: can yield no quality or virtue to Bathes, and therefore he that ſeeks to draw any virtne from ſtone into water, doth *lapidem lavare*, that is, labour in vain. But by reaſon of admixtures, they may, or whileſt they are in *ſucco lapideſcente*, before they are concreted. For if it be certain that Metals may yield virtue to Bathes, being alike indiſſoluble by water, there is no reaſon but Stones alſo may. *Fallopius* is againſt it in both, but contradicted by *Julius Cæſar, Clandinus*, and divers others; yet he confeſſeth that *Balneum montis Grotti*, hath *Gypſum*: and

In ingreſſu ad infirmos p.373. *Venuſtus in conſilio pro Petro Picardo.*

Geſner.

Baccius etym.

Geſner affirms the ſame of the Bathes of *Eugeſta.* Alſo he finds *ramenta marmoris in Balneo Corſenæ & Agnano*, but he judgeth that they receive no quality but from the juice, and I doubt not but he is in the right. And for *ſuccus lapideſcens*, we have many examples in *Agro Piſano & Lucenſi* in *Italy*, in *Avernia* in *France*, where this juice is ſo plentifully brought by a clear Spring, that after it is congealed, the people dig the ſtones, and have made a great Bridge of them. Alſo neer *Vienna* in *Savoy*, in a Village called *Giret*, is a clear Fountain which turns to ſtones as hard as flints: *Pliny* makes mention of the like Springs in *Eubea*, which are hot: and *Vitruvius* of the like at *Hieropolis* in *Phrygia*: Alſo *Joſephus Acoſta* of the like hot Springs in *Guaniavilica* in *Peru*, which turns to ſtone, whereof they build their houſes. *Anthonio de Herreza, cap.* 20. tells of the ſame Spring at *Guainia* at *Velica*, which turns to ſtone as it riſeth, and kills thoſe that drink of it. Alſo this *Succus lapideſcens* is obſerved in the Bathes of *Apono*, where it is converted into ſtone upon the ſides of the Bath. Alſo in the Bath of *Rancolani*, where this juice is not confuſed, but perfectly mixed with the water, and being imbybed by Plants, it hardens them like ſtone. *Baccius* tells us of a Cave by *Fileg* in *Tranſilvania*, which turns water into ſtone. The like is found at *Glainſtayns* in *Scotland*, as *Hector Boetius* reports. In *England* alſo we have many Fountains which turn wood into ſtone; which muſt be by reaſon of this *Succus lapideſcens* mixed with the water.

Lib. 6. c. 14.

Coral alſo being a Plant, and nouriſhed with this juice, turns to a ſtone: ſo doth the ſeed of Lithoſpermon or Gromel. Thus much of Stone.

CHAP. VI.

Of Bitumen. His kinds, qualities. Of Camphir in particular. That Bitumen is predominant in the waters of Bathe.

NExt I come to thoſe Minerals which we call *Bitumina*, which are mineral ſubſtances that burn and waſte in the fire without metalline fuſion, or ingreſſion. The greateſt affinity they have, is with Sulphur: but this hath ingreſſion into metal, and therefore I rank it among the Spirits, and *Bitumen* hath none. Of this kind ſome are ſolid, and ſome liquid. Solid, as *Succinum Gagates, Ambra, Camphora, Terra Ampelis, Lithanthrax, ſive Carboſoſſilis, &c.* Liquid, as *Petroleum* and *Naphta*. All theſe are great fuels to fire, eſpecially thoſe that are liquid, which are thought to draw fire unto them, if it be within their *effluvium*: So *Pliny* reports that *Medea* burnt *Creuſa* by anointing her Garland with *Naphtha*: and *Strabo* tells how *Alexanders* Bath-maſter *Athenophanes*, had almoſt burnt *Stephanus*, a Boy in the Bath, by ſprinkling *Naptha* upon him, if it had not been ſuddenly quenched. And this is that juice or thick water which *Plato* in *Timeo* reckons among fires, and which the *Egyptians* uſed in their Sacrifices,
Machab. 2, 1. and was hidden by the Jewiſh Prieſts in a dry

pit for 70 years, and afterwards found by *Nehemiah.*

But whereas it is a common received opinion, that ſome of theſe *Bitumina* will burn in water, I cannot believe it; although *Pliny* and *Agricola*, and moſt that have written ſince, out of them do averr it, and bring arguments and examples to prove it. For although water were a fewel to fire, as oyle is, yet there can be no fire without air, and water excludes air; and ſo doth oyle, if the fire be beneath it, and covered with it: As for their arguments, they ſay that *Bitumen* being ſprinkled with water, burns more, and therefore water is a fewel to it: as wee ſee that Smiths caſt water upon their Sea-cole in their Forges: but the reaſon of this is, becauſe their Coal being ſmall like duſt, the water makes it to cake and bake together, where otherwiſe the blaſt would blow it way: alſo it hinders the quick burning of it, and ſo makes it continue the longer: ſo in a *Vulcano* after Rain, they find the fire to burn more, when the *Bitumen* is ſmal, and in duſt. Although this may be a reaſon of it, that the Lyme which hath there been calcined, being by Rain diſſolved, increaſeth the fire. And whereas they ſay that water will kindle *Bitumen*, and quench *Sulphur* it is not ſo: neither doth their example of Wild-fire prove it. For in Wild-fire, beſides Bitumen and Camphir, there is a double proportion of quick Lymes, which by reaſon of the ſudden diſſolution of his Salt, by the effuſion of water, is apt to kindle any combuſtible matter; not by reaſon of any Bitumen in the Lyme, as ſome imagine, nor of any *Empyreuma* which the fire hath left in it, as *Fracaſtorius* thinks: for, how can there be any Bitumen left in the Lyme (if there were any at firſt,) after calcination: the fire would have conſumed that before any thing elſe. And as for any *Empyreuma*, it is certain that the more any thing is burnt, although the fire leave an aduſtion in it, the leſs apt it is to burn again, eſpecially being burnt and calcin'd *ad calcem aut cineres*, where all the combuſtible matter is ſpent. Wherefore it muſt needs be by the violent motion which is in the ſudden diſſolution of the Salt in it, as appears by the crackling it makes: *Et ex motu fit calor*; And motion cauſeth heat. The like we obſerve in *Pyrite ſterili*, whereof they make Vitriol; which being broken and laid up in heaps, and moiſtned with water, will gather heat, & kindle any combuſtible matter put to it. The like we find alſo in Allum Mines, &c. where thoſe mineral juices being concrete in the Mine, when they come to ſudden diſſolution do grow hot, and will kindle fuel. And as for the example of the Salt Lake whereof *Agricola* writes, between *Strapela* and *Seburgh*, which burns the fiſhermens nets if they be put near the bottome: and of the Lake *Sputa*, in *Media*; mentioned by *Strabo*, which burns Clothes put into it: I take that to be by reaſon of the corroſive quality of the Salt which frets them, being ſtronger near the bottome; and not from Bitumen, as *Agricola* thinks. The like I judge of the Lake by *Denſtadt* in *Turingia*. And it is very probable that Salt being heavier then Water, will be moſt towards the bottome: as it

De ſympath. & antipath. ca. 10.

De nat eor. q. efflu. è terra. l. 4. c. 22.

is reported of the fountain *Achilleus* in *Mileto*, whoſe water is very ſweet and freſh above, and very ſalt towards the bottom. So is the water of *Agnano* in *Italy*, as M. *Sandys* reports in his travels. And the more heavy and terreſtrial any ſalt is, the more corroſive it is: and ſo contrarywiſe, the more corroſive, the more heavy. *Ariſtotle* affirms the Sea-water to be more ſalt at the bottom than above: and ſo doth *Pliny*, who likewiſe makes mention of the Lake *Aſcanius* in *Chalcide*, whoſe top is ſweet,and bottom nitrous. *Baccius* writes the like of a Well near *Toletum* in *Spain*, the water whereof is ſweet above, and corroſive beneath; which he judgeth to be from Quick-ſilver. *Fallopius* is alſo of opinion, that Bitumen doth not only burn in water, but is nouriſhed by water, becauſe it makes the fire to laſt longer. But I have ſhewed the reaſon of that before. And for the burning in water, he ſhould have ſaid upon the water; for there it will burn as long as it ſwimmeth; but dip it under the water, and it is preſently extinguiſhed.

Meteor. 2.

Lib. 2. *c.* 11.

De Thermis, *c.* 5

And whereas ſome report that Queen *Ann* of bleſſed memory, being in our Kings Bath, there aroſe a flame of fire like a candle from the bottom of the Bath to the top near unto her, they muſt give me leave not to believe it, but rather to think they were miſtaken: for, I am not bound to believe any thing againſt reaſon, which God hath given me to be my guide. It might have been ſome bubble of wind which is frequent in our Baths, or ſome bituminous matter not diſſolved in the water, did ariſe, and being at the top, diſſolve it ſelf upon the ſurface in the form of a circle; but it could not be kindled. And if it might be kindled in the water (which were impoſſible) yet in all likelyhood it would have burnt better above the water than within it, and not be preſently extinct, as they report. Theſe *Bitumina* (excepting Camphir) are potentially hot and dry in the ſecond or third degree; but concerning Camphir there are two doubts. Firſt, whether it be a Bitumen or a Gum. Secondly, whether it be hot or cold. The Arabians affirm it to be the gum of a huge tree with white leaves, under whoſe ſhadow many wild beaſts may lye: and that after earth-quakes there is great plenty found; that it is in quality cold and dry in the third degree; ſome late writers follow them in their opinion of a Gum, as *Mathiolus*, *Amatus Luſitanus*, *Garcias ab horto*, &c. *Plateareus* holds it to be the juyce of an herb. But we muſt conſider that they make two ſorts of Camphir, the one of *Borneo*, the other of *Chyna*. For that of *Chyna* they confeſs it is adulterated with Bitumen: and that is the only Camphir in uſe with us. But that of *Borneo* to be a ſimple Gum, and that a pound of this is valued as dear as an hundred pound weight of the other. So that all the doubt lieth in this Camphir of *Borneo*; which whether it be a Gum or no, is ſtill in controverſie. For the Arabians not trading into thoſe parts, had the notice hereof only from others, as *Serapio* and *Avicen* do confeſs: and *Amatus Luſitanus* ſaith the inhabitants will not ſuffer ſtrangers to come aſhore to ſee it. So as we have been kept in ignorance a long time from the true knowledge of it. And *Garcias ab horto* tells us, that

Of Camphir.

Seraphio de ſimp. m. d.c. 344.
Avicen. lib. 1. tract. 1. c. 2.
Item. l. 2. tract. 2. cap. 133.
Item. de med. cordial. tract. 2. cap. 3.

In Dioſcoridem cap. de maſtich.

Lib.1.cap. 9.

that all his knowledge of it, is but by relation; himſelf not being able to travel to ſee it, partly by reaſon of his age, and partly for his continual imployment about the Viceroy, yet he ſaith, that that he had a piece of the wood given him: Only *Edvardus Barboſa* reports that he did ſee the place in *Borneo*, and found it to be of a mineral nature. But *Barboſa* his teſtimony is not authentical, having failed much in other of his relations: as where he reports that the Purcelan of *China* is made of Oyſter-ſhells, &c. He is contradicted by *Conſalvus Mendoſa* a man employed in thoſe parts by the King of Spain, for ſuch diſcoveries, and alſo by *Hugo a Linſchoten*, a man of great obſervation, and both of them of far better credit than he. I procured ſome of that Camphir to be brought from thence by my worthy friend Captain *Beſt*, but whether it be a Gum or a Bitumen, by the view I cannot diſcern, But if it be a Gum, ſaith *Solinander*, why ſhould it abound more after earth-quakes? and why ſhould it burn and not diſſolve in water? No Gums will burn, and all Gums will diſſolve in water: and earth-quakes make no trees fruitful, but may caſt forth minerals. That there is a natural bituminous Camphir, I make no doubt: and *Agricola* proves it ſufficiently: And the Bath in *Remandiola* near *Rhegium* ſhews it. Alſo the Well by *Muntzbach*, where *Tabernomontanus* ſaith there is mineral Camphir. *Averroes* ſaith, it is *affinis Bitumini*.

De nat. foſſil. lib. 4. cap. 2.

Theſaur. aqu. lib. 1. cap. 2.

I confeſs that when I publiſhed my firſt edition, I was perſwaded by *Solinanders* judgement, to think all Camphir to be a Bitumen, and namely that of *Borneo*, but ſince upon better enquiry, I find it otherwiſe. For Captain *Beſt*, beſides the relations made unto him in the *Indies*, concerning this Camphir, that it was from a tree, hath alſo procured me the teſtimony of Maſter *Andrew Cogganel*, under his own hand, that both the Camphir of *Borneo* and *Sumatra*, are gums of a tree, and no Bituminous matter, himſelf having been at the gathering of it, and at the cutting down of ſome of the trees. He hath alſo traded much in that commodity, and vented it at *Japan*; where it ſeems, as alſo at *Chyna*, they mix and adulterate it with ſome other matter, to increaſe the ſubſtançe, and abate the price; which mixture perhaps may be ſome Bituminous ſubſtance. This Maſter *Cogganell* hath lived 14 years in thoſe parts, and ſpeaks the uſual language, and hath been often upon that Iſland of *Borneo*.

Now for *Solinanders* reaſons, they are eaſily anſwered: no Gums, ſaith he, will burn, and all Gums will diſſolve in water. I grant it, if you take the word Gum in a ſtrict ſenſe, for watry Gums, as Tragacanth, Arabick, &c. But we uſe the word Gum in a more general ſenſe, comprehending under it all Roſins, Turpentines, Pitches, &c. which being unctuous and oily, will readily burn, and will not diſſolve in water. Among theſe Gums or Roſins, we reckon Camphir, and ſo that argument is anſwered. As for his other argument drawn from earth-quakes, mentioned by the Arabians, after which there is commonly more plenty of Camphir: this doth not prove it to be a mineral; For earth-quakes are as apt to caſt up freſh mould, whereby trees are made fruitful, as minerals. Wherefore let us ſubſcribe to the antient Arabians, although they were not eye-witneſſes hereof, and to the later obſervations of Spaniards and others; eſpecially now that we have a Countrey-man of our own, who hath had as good means to learn the truth of this, as any European ever had; who is yet living, and able to give ſatisfaction to any that are curious in theſe points.

Now for the qualities of it, the moſt general and trueſt opinion is, that it is cold and dry. *Matthiolus* judgeth it to be hot for three ſpecial reaſons. Firſt, becauſe it burns, and is a great fuel to fire. If this argument be good, then flax, and ſtraw, and paper, and touch-wood, and ſpunck ſhould be hot; for they are apt fuels to fire. Secondly, becauſe it is, *odorata*, and he holds all *odorata*, to be *calida*: *Galen* is of another opinion, and holds the judgement of ſimples by ſavour to be uncertain. And as for Camphir, *Galen* knew it not. *Avicen* ſaith expreſly of Camphir, that although it be *odorata*, yet it is *frigida*. And if *Matthiolus* his reaſon were good, then Roſes and Violets, and Vinegar ſhould be hot; for they are *odorata*. It is true that all ſavours ariſe from heat, as *Galen* ſaith, and all compounded bodies have ſome hot parts: but we ſpeak of the predominancy in the ſubject, and of the operation it hath upon mans body. Thirdly, becauſe it bites the tongue. So doth juice of Lemons, and Barberies, and Vinegar, &c. and yet they are cold. Wherefore I conclude our Camphir to be in quality cold and dry, and of very ſubtil

Comment. in Dioſc. & Epiſt. l. 3. Thaddæo Nemico.

De ſimpl. med. facult. l. 4. c. 22.

Lib. 1. tract. 1. c. [illegible]

ſubtil parts. Theſe *Bitumina* being unctuous and oily, diſſolve not of themſelves in water, without the help of ſome mineral juice, but may be confuſed with it. And we have many fountains and lakes which participate with them. In *Shropſhire* at *Pitchford*, is a Spring that caſteth forth Bitumen ſwimming upon the water. The like we read of in *Avernia* in *France*, between *Claremond* and *Monferan*, where the people gather it for their uſes. In *Italy* there are many fountains, yielding Bitumen; at *Maianum*, and *Saſſoli*, and *Salſa*, and *Herculanum* at the foot of the Mountain *Veſuvium*, at *Baia*, and alſo at the cape of S. *Helena*, and in the Iſle of *Woolfs* there are fountains of pitchie Bitumen, which are uſed to pitch ropes and tackling, as *Joſephus Acoſta* reports. And we have that famous lake *Aſphaltites* in *Judæa*, ſo full of Bitumen, that it hardly ſuffers any thing to ſink in it. The River *Liparis* in *Cilicia*, by reaſon of a Spring near *Solos*, is ſo full of liquid Bitumen, as they which ſwim or waſh in it, ſeem to be anointed with oyle. Alſo there are Bituminous Springs in *Saxony* at *Bruno*, in *Swevia* the lake *Tegera*, at *Gerſedorf* under the mount *Jurat*, in *Aſia* by *Tralleis* and *Niſſa*. Alſo in the *West-Indies* there are many found which they put to uſe for ſhipping. And this Bitumen is the chief ingredient in our Baths at *Bathe* in *Somerſet-ſhire*, although diluted with much Nitre, which makes the ſolution the better, and the water more clear. That Bitumen is predominant in theſe our Baths, may be proved by the effects, becauſe we finde them exceedingly to comfort the nerves, ſupple the joynts, dry up rheumes,

Bellonius de Naphtha c. 7.

Agric. de nat. cor. quæ efflu. è terra l. 2. c. 7.

Bitumen predominant in the Bathes of *Bath*,

ire Palſies, and Contractions, being diſtinctly
ed, tinct ſilver into the colour of gold, &c.
lſo by the Bituminous ſavour of them, and by
e neighbourhood of Cole-mines in thoſe parts.
ll which do argue Bitumen to abound in them.
nd whereas Doctor *William Turner* in his trea-
ſe of theſe Baths, thinketh Brimſtone to be the
ief mineral, and Copper next; I am not of his
pinion. The actual heat is no argument of
rimſtone, as ſhall be ſhewed when I come to
at point: neither doth the ſavour bewray it.
ut his reaſon for Copper is very weak. He found
Marcheſit upon one of the Hills, which he
ought to hold Copper: But Marcheſits al-
ough they ſhew yellow, yet they ſeldom hold
opper, or any other Metal. But his diſcourſe
ath perſwaded *John Bauhinus* to publiſh it con-
idently to the World. I ſhall have occaſion to
peak more of this hereafter. And thus much of
itumina.

De thermis Boll. l.3.c.6 1.

CHAP.

CHAP. VII.

Of Mineral juyces concrete: called by the Alchymiſts, Salts. The four principal ſorts of them; Salt, Nitre, Allum, Vitriol.

Libavius in Syntagm.p. 221

A Fourth ſort of minerals are concrete juyces which are mineral ſubſtances diſſoluble in water. Theſe the Alchymiſts call Salts, and are the means of communicating all other minerals with water. For as water is apt to diſſolve and extract vegetables, ſo are theſe concrete juyces apt to diſſolve and extract mineral ſubſtances. And although they are found ſometimes liquid being diſſolved by moyſture; yet we call them concrete, becauſe they will be concrete when the adventitious moyſture is removed. Our mineral Authors do make many ſorts of theſe according to the ſeveral minerals which they imbibe: but in truth they may be all reduced to four heads; Salt, Nitre, Allum, and Vitriol: And each of theſe hath divers ſpecies, as *Geber* and *Cæſalpinus* ſay of Salt, *quot genera calcium, tot genera ſalium.* Concerning Vitriol there may be ſome doubt whether it be a diſtinct ſpecies from Allum, and have received only ſome tincture from Copper or Iron, or from ſome of their brood, which are called excrements. For in diſtilling oyle of Vitriol, the lute wherewith the glaſſes are joyned, will yield perfect Allum. And Vitriol being boyl'd, ariſeth *in bullas* as Allum doth, and ſhoots like Allum *in glebas*; as Salt doth *in teſſeras*, and Nitre *in ſtirias*. The ſhooting or roching of concrete juyces, is worthy to be obſerved, ſeeing every kind hath his ſeveral manner or faſhion of ſhooting, whereby a man may ſee the perfection of each kind. For example, if Salt-peeter be brought you to examine whether it be perfect good or not, diſſolve it in water, and ſet it to ſhoot in a wooden-diſh, or with ſticks of Aſh, or other porous wood: and if it ſhoot in needles, (*in ſtirias*) it is right. But if any of it ſhoot in ſquares or angles, or lumps, it is mixt, and unfit either for Medicine or Gun-powder. The common Salt-peeter being prepared and cleanſed with aſhes, hath commonly much of the ſalt of the aſhes mixt with it in the liquors, which being brought to ſhoot, will ſettle firſt upon the wood in ſquares, (*in teſſeras*) and then the Salt-peeter will ſhoot upon it in needles. Theſe needles are good Salt-peeter, but the ſquares are other ſalt, and weaken the Salt-peeter in his operation; the like you may judge of other concrete juyces. There are alſo certain ſtones which we call *fluores*, which do naturally ſhoot in divers forms: as Chriſtal into ſix ſquares (*in ſexangulos.*) Sparr, which the Dutch call Sput or Querts, ſhoots into points like Diamonds, as we ſee in thoſe Corniſh or *Briſtol*-ſtones: *Oſteocolla* found by *Darmſtadt*, in the Palatinat, like bones: others like Oyſter or Muſcle-ſhells, &c. The reaſon of this ſeveral ſhooting in concrete juyces and other minerals, is hard to give. For if it did lye in the thinneſs or thickneſs, or clammineſs of the matter whereof they were made, that difference were taken away when divers ſorts are diſſolved together in the ſame water,

ter, for one would qualifie the other. But we find that this mixt water will yield his ſeveral ſalts diſtinctly, and all at once. So that it ſeems, for the ornament of the univerſe, that nature hath ſo diſtinguiſhed theſe ſpecies, as it doth plants; among which ſome have thick leaves, ſome thin, ſome long, round, jagged, &c. ſome have bulbous-roots, ſome long, ſtringy, &c. So in their flowers, fruits, colours, ſmells, &c. every kind hath his own faſhion. The reaſon hereof *Scaliger* ſaith cannot be drawn from the Elements, nor from the thinneſs, thickneſs, clamminеſs, heat, cold, dryneſs, moyſture, plenty, ſcarſity, &c. of the matter: but only from the form, *anima*, ſeed, &c. which frames every ſpecies to his own figure, order, number, quantity, colour, taſte, ſmell, &c. according to the ſcience, as *Severinus* terms it, which every ſeed hath of his own form. So alſo it is in minerals, which have their ſeveral and diſtinct ſpecies in nature, and their ſeeds to maintain and perpetuate the Species. Now that theſe concrete juyces are not bred commonly in theſe forms in the earth, the reaſon may be, either becauſe they are often intermixt with other minerals in their generation, or that their matter being plentiful, and room ſcanty, they have not ſcope to diſplay themſelves in their proper forms, or perhaps they want water to diſſolve them. But by artificial preparations, we find theſe diſtinctions: in which it is doubtful whether heat or cold, or dryneſs, do procure this ſhooting or roching in concrete juyces, and whether the ſame cauſes procure it in all. For dryneſs it is certain, that as moyſture diſſolves them, ſo dryneſs congeals

In lib. de plantis Ariſtoteli aſcriptum lib. 2. paſſim.

eals them ; but dryneſs being a paſſive quality, s not ſufficient ; it muſt be the action either of eat or cold , or both ; and the right ordering f theſe will open a door to the artifice of Bay-alt here in *England* , as well as in *France* or *pain*, or the Iſle of *Mayo*. Among theſe con-rete juices, *Agricola* reckons Sulphur, Bitumen, Auripigmentum, Sandaracha, Chriſocola , Ærugo, Myſi, Sori, Melanteria, &c. But if we exa-nine them aright ; we ſhall find , that either hey are not diſſoluble in water as concrete uices ſhould be, or they are ſome of thoſe juices incted or incorporated with other minerals. All heſe mineral juices are accounted hot and dry, nd aſtringent , and detergent, ſome more, ſome eſs ; and we take it ſo upon truſt. But this oint requires further conſideration and diſtin-ction.

Cæſalpinus de metalliſc.3.l.1.

Salt.

Salt is a fixed ſubſtance, not volatile in the ire , aſtringent, detergent, purging, diſperſing, epelling , attenuating, makes an eſcar, and reſerves from putrifaction , as *Dioſcorides* in-orms us , and *Galen* confirms the ſame, adding hat it is hot. But we muſt underſtand *Galen* with his limitation , *lib. 6. cap. 30.* That the more it is deterſory , the leſs it is aſtringent. And all aſtringent things are cold, as he avoucheth, *lib. 4. cap. 6. Acida, acerba, & aſtringentia omnia frigida.* Now if Salt be aſtringent, it muſt be cold by *Galens* own rule, and it is not enough to ſay it hath warm parts in it , but being an uniform ſubſtance , we muſt determine of it *ex predominio.* Alſo *Galen lib. 1. Sympt. cap. 4.* comparing pure water with ſea water,

Dioſc. l.5.c.84.
De ſimpl. med. facult.l.4.c.20. & l.11.c.50.

ſeems to affirm that ſea water, before it have received any great adventitious cold, may cool our bodies. And ſo this place is underſtood by *Anthonius Maria Venuſtus in conſilio pro Petro Picardo*, The repelling quality, and the making an eſcar, and the preſerving from putrifaction, are arguments of drineſs, and not of heat. For as heat and moiſture are principal agents in generation and corruption; ſo cold and drineſs in preſervation. Alſo I ſhould impute the purgative and deterſory qualities in Salt rather to the tenuity of parts, and the ſtimulation which it hath from thence, then to any heat; for then as *Sennertus* ſaith, all hot things ſhould purge; *Inſtit. lib.* 5. *part.* 1. *cap.* 11. *Valeriala in Gal. de conſtit, artis pag.* 447. And *Meſne Canon univerſal. cap.* 1. rejects all elementary qualities, temperaments, ſimilitudes, or contrarieties of ſubſtances, &c. in purging medicines. Alſo Tamarinds, Myrabolans, and Antimony do purge, and yet are cold, *Venuſtus, pag.* 132. But the purgative faculty of Medicines is from ſtimulation of the expulſive faculty of the ſtomach and guts, and not from attraction by heat of peculiar humours, as hath been imagined. Heat may ſerve as an inſtrument to actuate ſtimulation, as cold doth dull and benumb all faculties, but neither heat nor cold are principal agents in this work. And whereas Rhubarb is thought to purge choller only, Sena and Polipody melancholy, Agarick flegme, &c. becauſe we ſee the excrements tincted with the ſame colours, it is a deceit; for theſe purgations do colour humours in that manner. Yet I do not deny a diſtinction to be made of Purgations in other reſpects. And our antient Phyſitians through long experience have found out the right uſe of purging medicines, and their true diſtinctions for ſeveral uſes for mens bodies: as that ſome do purge groſs humours, and ſome thin, ſome are ſtrong, and ſome weak: ſome are comfortable to the Stomach, or Liver, or Spleen, &c. and ſome hurtfull to ſome of thoſe parts: ſome are too hot in ſome caſes, and ſome temperate, &c. but they have not diſcovered the true cauſe of this purging quality: ſome attributing it to a celeſtial influence, ſome to a hidden quality, which is as much as if they had ſaid nothing: ſome to a Sympathy, Antipathy, &c. For my part I hold the purgative quality of mixt bodies to lie principally in the terreſtrial part of them, which is their Salt: and therefore the Chymiſts uſe to acuate their purging extracts with their proper Salts. It were much better if they could make their Salts without calcination; for then they ſhould retain the taſte of the Simples, which lyeth in the Salt, and much other virtue which the fire conſumes in calcination,

Three wayes to make Vegetable Salts to retain the taſte of the herbs from whence they are drawn.

It were a delicate thing to have all our vegetable Salts to retain the taſte of the herbs and ſimples, from whence they are drawn: as of Wormwood, bitter; of Sorel, ſour; of Licoris, ſweet, &c. There are in mine opinion, three ſeveral wayes for it, although they be laborious. I. The one is by precipitation, when the juice or ſtrong decoction of any ſimple is precipitated by the addition of ſome appropriate liquor which will ſtrike down all other parts in the juice or decoction; but the Salt which is in it will not eaſily precipitate, but will remain in the liquor, and muſt be ſevered either by evaporation, or by roching. But in this work we muſt make choice of ſuch a precipitator, as may not infect our Salt with any ſtrange quality. 2. Another way is to make an extract of the ſimple which we deſire to work upon, and when we have made it ſo dry as it will be powdred, then pour upon it pure ſpirit of Wine, which will diſſolve no Salt, if it be without flegme. By this means through often repetitions of new infuſions, untill the extract will yield no more tincture unto the ſpirit of Wine, you ſhall find the Salt in the bottome, as a ſubſtance which the Spirit of Wine will not work upon, nor diſſolve. 3. A third way, as I conceive, may be in manner of the working of Salt-Peeter, by putrifying great quantities of the herbs, untill they become earth: and then by infuſions with water, to extract the Salt, which will not putrifie with the herb, but will remain in the earth. The ſecond courſe I have tryed, the other wayes are very probable. In theſe ſalts do lie the chief virtues of many ſimples, either for purging by ſtool, or urine, or for cleanſing, cooling, drying, ſtimulating, opening of obſtructions, attenuating of groſs humours, aſtriction, corroboration, &c. according to the nature of the ſimples: whereas the other Salts which are made by calcination, have loſt theſe virtues by the violence of fire, and cannot be diſtinguiſhed the one from the other.

Nitre. Nitre is a volatile ſubſtance which doth dry and attenuate more then Salt, and although it hath not ſo much aſtriction as Salt is ſaid to have, yet it ſeems to cool more then Salt, perhaps becauſe it is of thinner parts, and penetrates more, and that is the reaſon that it ſerves better for the diſſolution of Metals. In Phyſick we find our *Sal Nitrum* (which is a kind of it) to cool the body mightily, and therefore uſed in Juleps: Theſe Nitres alſo are apt to move ſweat; eſpecially thoſe that are drawn artificially from mixed bodies, as from Boles, Cordial Herbs, Bones, Horns, Teeth, Claws, Hoofs, &c. which are drawn by ſublimation. And theſe parts of Animals are found to be very ſoveraign againſt venome and maligne humours. The reaſon of it I take to be, not only the drying quality they have, whereby they reſiſt corruption of humours, but alſo & principally by reaſon of their volatile Salt or Nitre, whereby they move ſweat, and expell from the center of the body. For all their Salt is volatile, as may appear by this, that you can never make any *lixivium*, out of any of theſe animal Medicines, by calcination, as you do out of vegetables; their Salt being altogether evaporated by the fire. This volatile ſalt being taken into our bodies, and actuated by our natural heat, is commonly very Diaphoretick: and this is it which makes our Bezoar Stones, *Contra-yerva, Ungula del Bádo*, and ſuppoſed Unicorns Horn to be in ſuch eſteem.

Sal Ammoniack.

Sal Ammoniacum, is alſo a kind of Nitre, and volatile, and ſo is Borax and Altincar: but theſe are commonly mixed with *Sal Alcali*, and Urin or Vinegar, and ſo made more fix. There is alſo a natural *Fix Borax* found in the Iſle of *Lambay* neer *Dublin* in *Ireland*, which perhaps the Sea water hath fixt. Allum and Vitriol are much alike, but that Vitriol hath a garb from Copper or Iron. Theſe are very aſtringent, and without doubt cold, whatſoever hath been held of them. The waters or flegms diſtilled from them, do exceedingly cool in Juleps, as *Quercitan* and *Claudius Dariot*, have obſerved, and we alſo by daily experience do find true; by reaſon of the intenſe acidity they have, being diſtilled from their Terreſtrial parts. Alſo thoſe *Acidulæ* which the *Germans* call *Saurbrun*, proceeding from theſe Juices, are much uſed to quench the heat of fevers. It may be objected, that they are corroſives, and will eat into metal, and therefore muſt be hot. But by the ſame reaſon, the Juices of Lemons, Barberries, Howſleek, &c. ſhould be hot, for they will carve Iron. To bite and eat as a Corroſive, are not arguments of heat, but of piercing. Wherefore *Hypocrates* ſaith, *Frigus ulceribus mordax*, Cold bites Ulcers; and *frigus eſt principium destructivum, ut calor generativum*; Cold is a deſtructive principle, and Heat a generative. And therefore it is more probable that theſe corroſives are more cold then hot. Theſe two mineral juices are not ſo readily diſſolved in water, as the other two, and wil be more eaſily precipitated by any oppoſite ſubſtance that is more familiar to water. I omit the ſeveral ſorts of theſe concrete juices and their admixtures with other minerals, as impertinent to my purpoſe: wherefore I will ſhew ſome examples of each of them in natural Springs.

In peſtis Alexic. Dariot de præparat. med. Tract. 2. cap. 23, 24.

Lib. de Humidorum uſu.

For

Salt Springs.

For ſalt Springs, *Joſephus Acoſta* tells us of a rare Spring at a Farm neer *Cuſco* in *Peru*, which as it runs, turns into very white Salt, without any fire or art, in great abundance. In *Germany* are many ſalt Fountains, at *Luneburg*, *Stafford*, *Saltzburgh*, *Aldondorf*, *Halſtat*, *&c.* In *Italy*, *in agro Volaterano*, &c. In *Sicily*, at *Solinantia*, is a ſalt Well which is hot; and ſo are the *Pegaſæi Fontes* in *Caria*. Alſo the Fountain by *Medon* in *Træſen* is both ſalt and hot. Our *Wiches* in *Cheſhire* are well known. There are alſo Rivers of ſalt water by the *Caſpian* Streights, and in *Spain*, and *Caria*, and in *Bactria*, *Ochus* and *Oxus*. Alſo there are ſalt Lakes, as the *Terentine* Lake in *Italy*, the Lake between *Strapela* and *Seburgh* (mentioned before) in *Germany*, three Lakes in *Sicily*, and beſides an infinite number in other Countreys, the Lake of Lakes, the Sea. All which receive their ſaltneſs from Mines of Salt in the Earth, which are very frequent and huge in bigneſs, as may appear by the Rocks of Salt in *Bohemia*, in *Monte Carpato*, in *Polonia*, within two miles of *Cracovia*, in *Helvetia*, and *Rhetia*, where they have no other Salt but from the Rock. As alſo by the *Caſpian* Streights, are great Rocks of Salt. But *Marcus Paulus Venetus*, tells us of a Rock or Mountain of Salt in *Thaican*, able to furniſh all the world with Salt. So that it is no marvail that the Sea is ſalt, ſeeing it pierceth into the bowels of the earth, and diſcovereth many great Rocks of Salt which diſſolve in it. And this is the true cauſe of the ſaltneſs of the Sea. The

Lib. 3.

The true cauſe of the ſaltneſs of the Sea.

other cauſes alledged for it, are very improbable. For whereas *Ariſtotle* and his followers attribute the ſaltneſs of the Sea, to the evaporation of the freſh and ſweet parts of the water, by the Sun, and to an aduſtion procured alſo thereby: I anſwer, that neither the one nor the other can breed a ſubſtance in the water, which was not there before. For qualities can breed no ſubſtance, and aduſtion is but a quality imprinted, and no ſubſtance. Neither can evaporation breed any, but only diſcover that which was in it before, by taking away the thin parts, and leaving the terreſtrial behind. But we ſee the Sea water to contain in it the ſubſtance of Salt, and moſt of the Salt which we uſe is made of Sea water: and no man will deny that this Salt is differing from water in his ſubſtance and generation, being a diſtinct ſpecies in it ſelf. And whereas they alledge for confirmation of their opinion, that under the torrid Zone, the Sea is more ſalt then in other parts, the Sun exhaling more there, and making a greater aduſtion; I doubt it, both for the large & plentiful Rivers which thoſe parts afford, beyond any other parts of the world, and alſo for that the Sea water there is not hot, neither are the beams of the Sun ſo hot, but that men do endure them: and therefore not likely to breed an aduſtion in the Sea water, which muſt firſt be hot, before it be aduſted. Alſo it may be that thoſe parts do abound in Rocks of Salt, as we read of people in *Africa*, called *Ammantes*, who make them Houſes of Rock-Salt, and Caſtles, as that in *Sinu Geraico*, which is five miles in compaſs, and all of Salt: alſo the

Aliquid aquæ admixtum Ariſt. 2. Meteorol. cap. 3.

the Mountain *Orowenus* in *India* is all of Salt. Moreover if the Sun be able to do this in the Sea, which is alwayes in motion, whereby it eludes the force of the beams; why ſhould it not do the like, and much more in ſtanding Lakes, as the *Lemanus* and ſuch like? They anſwer that Lakes are continually ſupplyed and fed with freſh water from Springs. But ſo is the Sea continually fed with freſh water, and in as large a proportion, *cæteris paribus*, as Lakes are. For as the Sea is not increaſed by the influx of freſh waters, no more are divers Lakes, but keep the ſame fulneſs, and ſometimes are leſſened. And whereas they ſay that the upper part of the Sea is more ſalt then the botome, they ſpeak againſt all reaſon, ſalt being heavier then water, and againſt experience, as I have ſhewed in the former Chapter. Alſo *Ariſtotle* in ſome places confeſſeth it. But if any man will take the pains to vapour away 100. Tun if he will of freſh water, I do aſſure my ſelf he will not find one grain of ſalt at the bottome, if it were not in the water before. This may be tryed alſo in any diſtilled water, which we are ſure can have no Salt in it, (for Salt will not ariſe in diſtillation) and is as apt to yield Salt as any other water, if aduſtion or evaporation would breed it. Wherefore the ſaltneſs of the Sea is not from evaporation or aduſtion, but muſt needs proceed from Rocks of Salt in the Earth, which the Sea doth waſh, and diſſolve much of it. And conſidering the great uſe of Salt, both for other uſes, and for Generations, Nature hath provided enough of it, eſpecially in the Sea, which is more fruitful in that reſpect, then

Meteor. 2. *c.* 3.

the Land. Wherefore *Venus* was called Ἀλιγενὴς: *Eſt Venus orta Mari.*

Nitrous Waters. Nitre is ſeldome found in Bathes alone; but
mixt with other minerals, which it diſſolves, and
infects the water withall. Yet we read of a
Nitrous Lake called *Letis*, neer *Caleſtria* in
Macedonia, where they uſe to make Nitre, and
vent it to all parts. So they do at the *Nitrarie*
in *Egypt*. Alſo the Lake *Arethuſa* in *Armenia*,
is full of Nitre. At *Menis* in *Phrygia* is a
Spring of Nitrous water which is hot: Alſo in
Observat. l. 3. c. 76, 77. *Leonte* is a hot Nitrous Spring. *Bellonius* makes
mention of a Nitrous Fountain neer *Belba*, and
of abundance of Nitre upon a Plain neer thereunto;
which ſeems to be that which *Pliny* calls
Halmariga. But he denieth that there is any
Mine of Nitre under the earth, but that all is
Lib. 5. c. 7. bred out of the ſoyle as an *Effloreſcens* of the
earth: *Baccius* ſaith the ſame of Salt-peeter.
Agricola ſaith, that as the true Nitre is gathered
upon the Plains of *Media* above the earth, ſo
Lib. 31. c. 10. is Salt-peeter found above the earth in many places
of *Saxony*: That Nitre is gathered upon the
Plains of *Media*, are *Plinies* own words. *Exiguum
fit apud Medos caneſcentibus ſiccitate convallibus*;
There is a little to be found among
the Medes, where the Valleys are white with
Drought. So that it ſeemeth, his opinion was,
that Nitre is not bred in a Mine under the earth,
as *Geſner* alſo ſaith, *Epiſt. lib. 3. pag. 134.* but
in the earth it ſelf, as the chief fatneſs it hath to
further generations. And ſeeing earth is the
mother of all terreſtrial bodies, it is not left unfurniſhed
with thoſe mineral juices, nor ought

elſe that is requiſite for the production of Species: It hath been obſerved by ſome, that Nitrous water is the beſt ſoyle for ground, and brings all Plants to perfection far ſooner then any other dung, and therefore the *Egyptians* water their Coleworts with Nitrous water,

Nitroſa viridis braſſica fiet aqua. *Martial.*

If you a Colewort green would ſee,
Then let your water Nitrous be.

Our Salt-peeter men do find, that if any fat earth be covered from Rain and Sun, ſo as it ſpendeth not his ſtrength in producing of Herbs or Graſs, it will breed plenty of Salt-peeter, otherwiſe it will yield none. The difference between Salt-peeter, and the antient Nitre, appears in this, that a pound of Nitre being burnt, will leave four ounces of aſhes; Salt-peeter will leave none. Salt-peeter is actually ſo cold, as being diſſolved in water, it is uſed in *Rome* and *Naples* to cool their Wine, and doth it as well as Ice or Snow. Alſo we uſe it inwardly in cooling Juleps, and therefore it ſeems alſo to be potentially cold, as *Bellonius* judgeth.

Allum Springs.

Now I come to Allum (*Indignum vox ipſa jubet renovare dolorem*) the greateſt debtor I have, and I the beſt benefactor to it, as ſhall appear when I ſhall think fit to publiſh the Artifice thereof. In *Illun*, a mile from *Rio*, is an Allum Fountain: alſo there are divers in *Agro Senenſi*, *Volaterano*, *Lucenſi*, in *Italy*: *Balneum de villa* is full of Allum; and with us in *Shrop-*

ſhire at *Okenyate*, are Allum ſprings, whereof the Dyers of *Shrewsbury* make uſe inſtead of Allum. As for Allum Mines, they are frequent almoſt in all Countreys, but the chiefeſt that are wrought, are at *Capſylar* in *Thracia*, at *Tolpha* neer *Civita Vecchia* in *Italy*, at *Commatow* by *Auſſig* in *Germany*, and with us in *York-ſhire*. In *Ireland* there have been allum works neer to *Armagh*, as *Thurneiſer* reports: alſo at *Metelin* in *Spain*, at *Mazaron* neer *Carthage*, at *Helleſpont*, *Maſſa*, *Montrond*, *Piambin*, *Volterra*, *Campiglia*, &c. as *Beringaccio Sieneſe* reports. Alſo there are divers earths yielding allum, as at *Guyder* in *Carnarvan-ſhire*, at *Camfurt* in *Dorſet-ſhire*, and in the Iſle of *Wight*. But I will contract my ſelf for allum, and come to Vitriol.

Pyrotech. l. 2. c. 6.

Vitrioline waters.

Vitriol, as I have ſaid before, doth participate much with allum in the manner of ſhooting or roching, which is *in glebas*, in the hard diſſolution and eaſie congelation, in their ariſing *in bullas* being burnt, and in their precipitation: inſomuch as it is probable that the baſis of Vitriol is nothing but allum. It is found in mineral waters of two ſorts. The one where the very body and ſubſtance is diſſolved; as in *Cyprus*, which *Galen* deſcribes, where the water is green: alſo at *Smolnicium* in *Hungary*, in *Tranſilvania ad Carpatum montem*, at *Nenſola*, &c. In which places Copper is ordinarily made out of Iron by infuſing it in theſe waters. I will not determine whether this be tranſmutation of one ſpecies into another, as ſome do hold, or rather a precipitation of the Copper which was formerly diſſolved in the water by means of the ſharp Vitriol; which

Simp.med.facul. l. 9. c. 61.

Libav. in Symag.3.part.l.7. Item ſingularium part. 1.

hich meeting with Iron, corrodes it, and im-
beth it, rather than the Copper, and ſo lets the
opper fall, and imbraceth the Iron in place of
. We daily ſee the like in *Aqua-fortis*, which
ving imbibed one metal, will readily embrace
nother that is more familiar to it, and let fall the
ſt. So Allum or Copperaſs-water having ſome
rong Lixivium of Tartar or other calcin'd ſalt
ıt to it, the Allum or Copperaſs will preſently
ll to the bottom, and precipitate and give place
the Lixivium, as a thing more familiar to wa-
r, and of more eaſie diſſolution. But as I ſaid,
will not determine this queſtion, becauſe it is
ot much pertinent to our buſineſs. Yet I will
ot omit the judgement of *Lazarus Ercker* the
mperors chief Mine-maſter in the Kingdom of
ohemia, who profeſſeth that he was long of this
pinion, but altered it upon this reaſon; That
y exact proof he found more Copper ſtricken
own this way by Iron, than the water before did
ontain, and with the Copper ſome Silver. The
her kind of Vitriol water is, where not the bo-
y and ſubſtance of Vitriol is diſſolved, but the
irit or vapour, or quality communicated to the
ater: of this ſort are our Vitriol Baths for the
oſt part, and theſe are in themſelves wholſome,
nd are ſour, if the Vitriol be predominant. Such
e moſt of our *Acidulæ*; whereof we have ma-
y in *Viterbio & Volaterano*, *Balneum ad mor-*
um dictum, *Saurbrun* by *Franckford ad Oderam*,
cc. There are ſour waters alſo from Allum, but
ilder: alſo from Sulphur, whoſe ſpirit or vapour
eing burnt, is little differing from the ſpirit of
itriol, but ſomewhat fatter. But the moſt part

Lib. 3. Von. Kupffer ertz.

Io. Bauhinus de thermis l. 2. c. 2.

of our *Acidulæ* are from Vitriol. This ſour ſpirit of Allum, Vitriol or Sulphur, *Libavius* judgeth with *Thomas Jordanus* to be, in the terreſtrial parts of theſe minerals, becauſe it goeth not away by boyling or diſtillation, and therefore to be communicated with water by the corporal ſubſtance or juyce of them. But that holds not in mineral ſpirits which are heavier than water, as may appear by evaporation of any water made ſour with ſpirit of Vitriol or Sulphur, where after long evaporation, that which remains will be more ſour than before evaporation. So it is alſo in Vinegar, being a vegetable juyce. The ſpirit of wine doth certainly ariſe firſt in diſtillation, and the firſt is the beſt, being more volatil than the vapour of water. But this *ſpiritus acetoſus* which is in Sulphur, Allum, Vitriol and Vinegar, ariſeth laſt; and the more you diſtill away from it, the ſharper it ariſeth, and the ſourer is that which remaineth. Thus much for Vitriol and concrete juyces.

De judicio aqu. miner. p. 2 c. 36.

CHAP.

CHAP. VIII.

f Mineral Spirits; Quick-ſilver, Sulphur or Brimſtone, Arſenick, with his kinds, Cadmia.

A Fift kind of Minerals are called Spirits;
theſe are volatil in the fire, and have in-
eſſion into Metals, but no metalline fuſion.
heſe are Quick-ſilver, Sulphur, Arſenick, Cad-
ia, Ruſma, &c. All which being volatil, will
ſily ſublime, and being mixed with metals, as
admia's ordinarily to make Braſs, will alter the
lour of the metal, and make it leſs fuſible, and
ſs malleable. I will briefly run over the exam-
es of theſe and their virtues or qualities, being
ore obſcure, and in our Baths leſs uſeful than
e former, and more rare.

Quick-ſilver was not well known to *Galen*, *Simpl. med. facult. l. 5. c. 59.*
r he confeſſeth that he had no experience of it,
d did think it to be meerly artificial, and not
turally bred in the earth. *Dioſcorides* makes
mention of the temperature of it, but holds it
be a pernitious venome, and to fret the en-
ails; although *Matthiolus* affirms that it is
fely given to women to further their deliver-
ce, and we find it ſo by often experience, both
that cauſe, and in Worms, and in the French
iſeaſe and Leproſies, if it be ſkilfully prepared,
d with judgement adminiſtred. *Fallopius* holds
to be one of the miracles of nature. Thoſe that
ke upon them to determine of the qualities of
, are much diſtracted; ſome reckoning it to be
t and dry, and ſome cold and moiſt; and both
in

Vidus Vidius curat. generat. p. 2. ſect. 2. l. 3. c. 13. Fallopius de metallis c. 37.

Quick-ſilver not reducible to the Elementary Qualities

in a high degree. But in this account they conſider not the qualities of the ingredients in the preparation; whether it be ſublim'd or precipitated. For my part I know not how to reduce it to the Elementary qualities: neither am I aſhamed of mine ignorance in it, ſeeing no man hitherto hath given true ſatisfaction herein. And if it be true that the elements do not concur to the generation of mixt bodies, (as I ſhall ſhew, *cap.* 11.) we need not marvail if we find them not where they be not. But for our own uſe, where reaſon fails us, let us be guided by experience. We find by experience, that it cuts, attenuates, penetrates, melts, reſolves, purges both *ad centrum & a centro*, heats, cools, &c. and is a tranſcendent beyond our rules of Philoſophy, and a monſter in nature, as *Renodæus* ſaith. For our purpoſe it is enough to know whether it will impart any quality to water; which *Fallopius*, *Baccius*, *Solinander*, *Bauhinus*, and *Felix Platerus* do acknowledge. But it gives no taſte to it, neither have we many examples of Baths which contain it. In *Serra Morena* in *Spain*, near the Village *Almedien*, is a Cave where are many Wells infected (as is thought) with Quick-ſilver, becauſe much of that mineral is extracted from thence, out of a red ſtone called *Minium nativum*. About fifty miles from thence in *Valentiola*, there is another fountain called *La Nava*, of a ſharp taſte, and held to proceed from Quick-ſilver, and theſe waters are found wholſome. So are the waters at *Almagra* and *Toletum*, and others by the River *Minius*, which are hot. There are many venomous ſprings attributed to Quick-ſilver, as ie red fountain in *Æthiopia,* others in *Boetia,* *'aa* in *Trigloditis, Stix* in *Arcadia, Stix* in *'heſſalia, Licus* in *Sicilia,* &c. which perhaps e from other minerals, ſeeing we find ſome om Quick-ſilver to be wholſome. For Mines f Quick-ſilver, we read of many in *Bœtica, lttica, Ionia,* out of a ſtone which *Pliny* calls *'omica liquoris æterni.* In *Germany* at *Lands-rg,* at *Creucenachum, Schenbach, Baraum* above *rage, Kunningſtien,* &c. In *Scotland* three miles eyond *Barwick,* I found a red ſtone, which I ok to be *minium nativum,* ſeeing *Agricola* akes mention of it in *Scotland,* but by a miſhance could not try it.

Sulphur.

Sulphur attracts, contracts, reſolves, mollifies, ſcuſſes, whereby it ſhews a manifeſt heat, though ot intenſe, yet the fume of it is very ſour, and erefore muſt cool and dry: and I perſwade my lf that there is no better fume to correct venoous and infectious air, than this of Sulphur, or remove infections out of rooms, clothes, bedng, veſſels, &c. We muſt acknowledge difring parts in all compounded bodies; as Rhurb hath a purgative quality in the infuſion, and aſtrictive in the Terreſtrial ſubſtance, where e ſalt hath been by infuſion extracted. The bſtance of Sulphur is very fat (*Sulphure nihil nguins*) ſaith *Felix Platerus,* and this is the uſe of his eaſie taking of fire, and not any proinquity it hath with fire in the quality of heat: r if it were very hot, *Dioſcorides* would not mmend it *purulenta extuſſientibus,* the next or to a Hectick. Alſo *Galen* ſaith, that fat ings are moderately hot, and are rather nutriments than medicaments. Now for Sulphurous Baths, they are very frequent, and if we ſhould believe ſome, there are no hot Baths but participate with Sulphur, but they are deceived, as ſhall appear hereafter, when we come to ſhew the true cauſes of the heat of Baths. Neither are all ſulphurous Baths hot. *Geſner* reports of a Bath by *Zurich* very cold, and yet ſulphurous: *Agricola* of another by *Buda* in *Pannonia*. In *Campania* by the Leucogæan Hills, are cold Springs full of Brimſtone. Alſo there are hot Baths without any ſhew of ſulphur that can be diſcerned, as the Baths of *Petriolum* in *Italy*, the Baths *Caldanellæ* and *de Avinione in agro Senenſi, de Gratta in Viterbienſi, de aquis in piſanis collibus, Divi Johannis in agro Lucenſi, in Alſatia* another not far from *Geberſallerum*, &c. All which are very hot, and yet give no ſign of Sulphur either by taſte or ſmell, or effects. And yet no doubt there are many Baths having a ſulphurous ſmell from other minerals; as from Bitumen, Vitriol, Sandaracha, Allum, &c. which are hardly to be diſcerned (if at all) from Sulphur. So we commonly ſay, if a houſe or a tree be ſet on fire by lightning, that it ſmells of Brimſtone when there was no Brimſtone there. Many things combuſted, will yield a nidorous ſmell not diſcernable after burning what the things were. But there are divers truly ſulphurous Baths which contain Sulphur, although not perfectly mixt with the water without ſome *medium*, but only confuſed: for perfect Sulphur wil not diſſolve in water no more than Bitumen The ſpirit of Sulphur may be communicated t

wate

water, and ſo may the matter of Sulphur before
t hath attained his perfect form and conſiſtence;
therwiſe it is only confuſed with water, and
lters it into a milky colour. *Sulphurea Nar al-
us aqua,* Nar with Sulphurous water white.
At *Baia* are divers hot ſulphurous Baths, and
very where in *Hetruria,* in *Sicily, in Dioceſi
'anormitana*; the Baths of *Apono,* as *Savana-
ola Muntagnana,* and *Fallopius* avers, although
ohn de dondis denieth it; the Bath of *Aſtru-
um,* of *Callatura,* S. *Euphemie, Aquiſgran, Bri-
nſes thermæ in Valeſiis Helvetiorum, Aqua ſan-
a in Picenis,* and an infinite number every
here. *Baccius* reckons our Baths of *Bath* among
lphurous Baths, from the relation of *Edward
arne* when he was Embaſſador to *Julius tertius,*
d *Paulus quartus.* I will not deny ſome touch
Sulphur in them, ſeeing we find among bitu-
inous coals, ſome which are called metal coals,
ith certain yellow vains which are Sulphur. But
e proportion of Sulphur to Bitumen, is very
tle; and therefore I do not hold them Sul-
urous *a prædominio.* This is enough for Sul-
ur.

Concerning Arſenick, it is a venomous mi- Arſenick.
ral, and therefore I need ſpeak nothing of the
ths which proceed from it, but that we take
ed of them; It is likely that thoſe venomous
ters and vapours which kill ſuddenly, do pro-
ed from Arſenick, as at *Cicrum* in *Thracia,
as Neptunius in Terracina,* at *Peraut* by *Mom-
ier,* the *Lake Avernus. The cave of Charon
Naples.* Under Arſenick we may comprehend
ripigmentum, Riſagalum, Sandaracha, Ruſ-

ma, &c. I hear of but one Mine of *Ruſma* in *Ciprus*, from whence the Turks have it to take off hair, and it doth it beſt of any thing known, as *Bellonius* and *Platerus* report, and I have made tryal of it oftentimes: The former ſorts of Arſenick are found in *Miſia Helleſpontia in Ponto*, by the River *Hippanis*, which is made bitter by it. In the leſſer *Aſia*, between *Magneſia* and *Euphesus* in *Carmania*, &c. It is accounted to be extreme hot and putrifying.

Cadmia. *Cadmia* is either natural or fictitious: The natural is often dangerous in *Germany*, as *Agricola* ſaith, eſpecially that which is liquid, which is a ſtrong corroſive: the other is of the nature of Copper, moderately hot and cleanſing; and eſpecially good to clear the eyes, as *Calaminaris* and *Tutia*. It is found in Copper Mines, and of it ſelf in *Ciprus*, as *Galen* ſaith by the City *Solos*. Alſo in *Agro Senenſi*, *Vicentino*, *Bergomenſi*, neer *Como*, where they make Braſs with it. Under *Mendip* hills there is much of it. The Baths of Saint *Caſſian* do participate with it, and *Cicero* his Baths neer *Baia*. Alſo the Bath at *Zurich* in *Helvetia*, and *Grotta* in *Viterbio*.

Thus much for Spirits.

CHAP.

CHAP. IX.

Of mean metals, or half metals. Biſmutum or Tin-glaſs, Antimony, Bell-metal.

A Sixt ſort I make to be mean metals, or half metals, which are mineral ſubſtances, having metalline fuſion, but are not malleable as metals are: and therefore being mixt with metals, do make them brittle. Theſe are *Biſmutum*, or *plumbum cinereum*, Antimony, Bell-metal, which *Geber* calls *Magneſia*, in Dutch *Speiſſ*. *Calaem* alſo may be reckoned among thoſe, which is a kind of white metalline *Cadmia*, brought out of the *Eaſt-Indies*, which hath both metalline ingreſſion, and metalline fuſion, but not perfectly malleable. Theſe although they are more volatil than metal, yet by reaſon of their fuſion into a King, are not ſo eaſily ſublim'd as the Spirits.

Biſmutum, or Tin-glaſs.

Biſmutum is that we call Tin-glaſs, differing both from Tin and Lead. *Candidius nigro, ſed plumbo nigrius albo*, whiter than black, but blacker than white lead. It was not known to the Antients, and therefore we can ſay little of the qualities of it. It is found in *England*, and in *Miſnia*, and at *Sneberg* in *Germany*, and in very few places elſe. I read not of any waters that participate with it: neither can I ſay much of Antimony, but that *Dioſcorides* ſaith it cools, binds, opens obſtructions, &c. And *Galen*, that it dryeth and bindeth, and is good for the eyes, &c. But of the purging quality they write nothing, although we find it to purge violently, both upwards and downwards: whereupon we may gather that all purging medicines are not hot, as I have* touched before. *Cambden* ſaith there is a Mine of it in *Cumberland*: It is found in *Italy, in Thinni montibus, in Senenſi agro* in the County of S. *Flora*, and in *Germany* in many places. But I read of no waters that participate with it, unleſs we ſhould judge all purgative waters to be infected with it; as neer *Ormus*, *Purchas* writes of ſuch a Spring which purgeth. *Savanarola in* Part.3.pag.72. *Balneis Romandiolæ*, mentions a Spring at *Meldula*, which purgeth. Alſo *Balneum Tertutii in agro Piſtorienſi, Fallopio*; alſo the four water of *Mendich* and *Ponterbon* do purge choler, as *Rulandus* ſaith. At *None-ſuch* we have alſo a purgative Spring, which may participate with Antimony or Nitre, or both: But purgative waters are rare, unleſs it be *ratione ponderis*, by the weight and quantity, and ſo any water may purge, and our *Bath*-waters do purge in that manner, and by the addition of Salt, which gives ſtimulation unto it. This our *Bath*-guides do ordinarily preſcribe to ſuch as will be perſwaded by them, not knowing how it agreeth with their griefs, nor how it may do hurt in many reſpects, as oftentimes it doth.

Bell-metal is thought to be a mixture of Tin and Copper-Oars, as *Kentman* judgeth, and is found in our Tin and Copper-Mines in *Cornewall*. I read of no waters infected with it, nor of any uſe it hath in Phyſick.

CHAP.

CHAP. X.

Of Metals; Gold, Silver, Iron, Copper, Tin, Lead.

THe ſeventh and laſt ſort are metals, mineral ſubſtances, fuſible and malleable. Theſe e commonly diſtinguiſhed into perfect and im-erfect; perfect, becauſe they have leſs impu-ty or heterogenity in them, as Gold and Silver. he reſt are called imperfect, becauſe they are ll of impurities,and they are either hard or ſoft. ard, as thoſe which will indure ignition before ey melt, as Iron and Copper: Soft, which ill not, but melt at the firſt, as Tin and Lead.

Fallop. de metallis cap. 10. *Libav. de nat. metall. part.* 3. *cap.* 5.

All theſe metals are found in His Majeſties ominions, and many of them I perſwade my lf, might be wrought to better profit, if our nelters were skilful, or were not hindred by ſi-ſter reſpects. But eſpecially we abound in the nperfect metals more than enough to ſerve our vn uſe. And for the perfect metals, I have ſeen oth in *Cornewall* and at *Crayfordmuir* in *Scot-nd*, perfect Gold (which the Dutch call *Gedi-n*) in grains among Sparr. Alſo among other etals, it is ordinarily bred, as Iron and Copper, d Tin. But from Tin it is hardly ſeparated thout more waſte of Tin than the Gold is worth. om Iron and Copper I ſee no reaſon but it ght be ſeparated with advantage.

Gold.

For ſilver,there is much loſt for want of taking orth of Lead-Oars: for whereas thoſe Oars ich are rich in ſilver, are commonly hard of

Silver.

fuſion; our mineral men either neglect thoſe Oars, and work them not, or elſe they mix ſome ſmall proportion of them with their poor Oars, which are eaſie of fuſion, and ſo make the metal ſo poor, as it is not worth the refining. Whereas if they were wrought by themſelves, they would yield in ſilver upon every Tun, ſome 2 ounces, ſome 40, ſome 60, ſome 80, more o leſs.

Copper.

For Copper, whereas we fetch our Pins an Tags of Points from other Countreys, yet n doubt we might be furniſhed of our own, bot for theſe and other uſes. We have but one Copper work that I hear of in all his Majeſties Dominions, and that is at *Keſwick* in *Cumberland* but Copper Mines are found in divers other part as in *Cornwall* at *Trevaſcus*, and other places i *York-ſhire*, *Scotland*, *Ireland*, &c. And no doub many are concealed, by reaſon they are Mine Royal. If theſe were wrought, and wrought after a good manner, it is likely they would brin a good advantage to his Majeſty, and to th Kingdom.

Iron.

For Iron, we have the Oar in abundance, b it is pity that ſo much good wood ſhould be waſted upon it for ſo bad iron; and yet the gol which it holds, is loſt. Many have propounde the melting of it with ſtone-coal, but perha they have failed in their projects: yet this do not prove the impoſſibility of it. And for th goodneſs of this metal, if it were rightly made, would melt as readily as other metal, and woul be tough, and not ſo brittle as it is, and wou not be ſo apt to ruſt. For theſe inconvenienc

happe

happen to it for want of ſeparation of the impurities which are bred with it.

Tin. For Tin, we have as good as any in the World, although it is not wrought to the beſt advantage. The Countreys where it grows, are barren of wood, and they are fain to fetch it far off. Now if it were wrought, as I know it may, by many experiments which I have made upon it, with ſtone-coal, there would be much ſaved, and the wood might be otherwiſe employed. The Tin alſo would be as good as now it is, and the product not diminiſhed.

Lead. For Lead, although for ſoft Oars the ordinary courſe of melting at *Mendip* and the *Peak*, may ſerve well, and much better than their Baling at *Alendale* in *Hexamſhire*, and at *Graſs* in the Biſhoprick of *Dureſme*: yet for hard Oars (which are commonly rich in ſilver) there might be better courſes taken, by common or proper Agents. Common agents are fire and water; proper are diſſolvents or additaments. By fire they might amend their working, if they did roaſt their Oars well before melting, to breath away volatil and combuſtible ſubſtances which are mixed with their Oars. By water, after calcination or roaſting, they may ſeparate all diſſoluble juyces, &c.

Diſſolvents do chiefly ſerve to ſeparate the ſilver or gold out of the Oars: as in the quickſilver work, or by Lyes of Nitre, Allum, Salts, &c.

Additaments are alſo of great uſe, whether they be ſegregatory for ſeparation of ſpirits, or mean metals from our Oars, and ſo to facilitate their fuſion: or propugnatory to defend the Oares from conſuming or vitrifying. Segregatory additaments are either ſuch as are more eaſie of fuſion than the Oare, and ſo draw the Oare into fuſion with them; or ſuch as will not melt at all, as *Geber* ſaith, *Cujus intentio non ſit fundi*: which keeps the Oar aſunder from clodding, and gives it a greater heat, like fire in his boſom. By theſe means well applyed and uſed, all Lead Oares might be wrought, be they never ſo ſtubborn, and none need to be neglected. Hitherto I have digreſſed out of mine intended courſe, through the deſire I have to advance mineral works. Now I will return to ſhew the nature and qualities of theſe metals, as I have done of other minerals.

Nature and qualities of Gold.

Gold of all Metals is the moſt ſolid, and therefore the moſt heavy, as having few impurities or heterogeneal ſubſtances mixed with it. And therefore it is not ſubject to corruption, as other metals are, neither will it loſe any of his ſubſtance, either by fire or water, although it ſhould be held in them a long time: ſo as it is an idle and vain perſwaſion that many have, who think by boyling Gold in Broth, to get ſome ſtrength from thence, and ſo to make the Broths more cordial. The like I may ſay of putting Gold into Electuaries or Pills, unleſs it be in caſe of Quickſilver taken into the body, which the Gold by touch may gather to it; otherwiſe it goes out of the body as it came in, without any concoction or alteration, or diminution. And if it be diſſolved in ſtrong water, it will be reduced again to his metalline ſubſtance, without diminution;

Baccius lib. 6. cap. 8.

tion, much leſs will it be diſſolved without corroſive Spirits, to make *Aurum Potabile*, as ſome do undertake. *Grollius* doth acknowledge, that there is but one *Menſtruum* in the world that may do it, and that he knows not. But if we had it diſſolved, we are yet uncertain what the quality of it would be, or what uſe to make of it in Phyſick; only becauſe it loſeth none of his ſubſtance, we know it can do no hurt, and therefore we uſe it for Cauteries, & to quench in Beer or Wine, &c. to warm it, or to give it ſome aſtriction from the fire. *Fallopius* in theſe regards diſclaims it in all mineral waters, as he doth all other metals: and will not believe that any metal doth impart any quality unto water. *Claudinus* holds otherwiſe, and ſo doth *Buccius*, *Savanarola, Montagnana, Venuſtus, Solinander*, and almoſt all that have written of Bathes. For if we ſhould exclude Metals, we muſt likewiſe exclude Stones, and Bitumina and Sulphur; and almoſt all minerals, except concrete juices. For none of theſe, after they have attained to their full conſiſtence, will of themſelves diſſolve in water, without the help of ſome concrete juice, as a medium to unite them with the water. But before they have their full conſiſtence, whilſt they are in *Solutis principiis*, as Earth, Juice, or Vapour, they may be communicated with water. Gold is ſo ſparingly bred in the bowels of the Earth, as in that reſpect it can hardly furniſh a perpetual Spring with any quality from it; yet ſome Bathes are held to participate with Gold, as *Ficancellenſes, Fabariæ, Piperinæ, de Grotta in Viterbio: Sancti Caſiani de Buxo, &c.*

Baſilica chimia pag. 204.

De Thermis cap. 8.

In ingreſſu ad infermo:, pap. 373.

Silver

Of Silver.]

Silver comes next in purity to Gold, but is inferiour unto it, as appears by the diſſolution of it, and by the blew tincture which it yields, and by the fouling of the fingers, &c. For the qualities of it, there is not much diſcovered. But as all other things of price are ſuperſtitiouſly accounted cordial, ſo is this, eſpecially in hot and moiſt diſtempers of the heart: for it is eſteemed to be cold, and dry, and aſtringent, and yet emollient. We have no Bathes which do manifeſtly participate with it: perhaps, by reaſon, nature doth not produce it in ſufficient quantity to infect waters. *John Bauhinus* thinks there may be Silver in the Bathes at *Boll*: becauſe he ſaith there was a Pyritis or Marcheſit examined by Doctor *Cadner*, and out of fifty pound weight of it, he drew two drams of Silver: a very ſmall proportion to ground his opinion upon.

Theod Tabernomontanus, p.2. cap. 8.

Of Iron and Steel.

Iron is the moſt impure of all metals, as we have it wrought, and will hardly melt as metals ſhould do, but with additaments and fluſſes. Neither is it ſo malleable, and ductible as other metals are, by reaſon of his many impurities. Yet we ſee that at *Damaſco* they work and refine it in ſuch ſort, as it will melt at a Lamp, and is ſo tough, as it will hardly break. And this is not by reaſon of any ſpecial Mine differing from other Iron Mines, for they have no Mines of Iron near to *Damaſcus*, as *Bellonius* reports, but have it brought thither from divers other places, only their art in working and purifying it is beyond ours. So the Spaniſh Steel and Iron is purer then ours, and we do eſteem of

Bilbo-blades beyond others, which are quenched in the River *Bilbilis* : as *Turnus* his Sword in *Virgil* was quenched in the River *Styx*.

Enſem quem Dauno ignipotens Deus ipſe parenti
Fecerat, & Stygia candentem extinxerat unda.

Æneid 12.

A Sword the god of fire, of his own make,
Gave Daune, Turn's Father, quench'd in Stygian
Lake.

But the hardning of Steel lyeth not in this point; other waters no doubt may ſerve as well. But I perſwade my ſelf that our Iron may be made much purer, and perhaps ſome Gold extracted from it which it holds.

Concerning the temperature of Iron and Steel, *Galen* reckons it among earth, and therefore it muſt be cold. *Manardus* is abſolutely of that opinion, and ſo are moſt of our Phyſitians. Only *Fallopius* holds it to be hot, becauſe *Scribonius Largus* preſcribes it in Ulcers of the Bladder, which it doth cure, not in regard of heating, but drying; for it dryeth and bindeth much, and therefore by *Galens* rule it muſt be cold. *Aſtringentia omnia frigida*; all binding things are cold. I have obſerved in Iron and Steel two diſtinct qualities, the one opening, or deopilative; the other aſtringent. The opening quality lyeth in a volatile Salt or Nitre, which it is full of, the aſtringent quality in the Crocus, or Terreſtrial part. Theſe two ſubſtances are thus diſcerned and ſevered. Take of the fylings of Steel or Iron, and caſt it into the flame of a Candle,

Simpl. lib. 9.

Lib. 16. *Epiſt.* 5. *De metallis cap.* 20.

Simpl. l. 7. *c.* 4.

Two diſtinct qualities in Steel.

Candle, and you ſhall ſee it to burn like Saltpeeter or Roſin. Take theſe fylings, and infuſe them three or four times in Water or Wine, as we uſe to make our Chalibeat Wines, till the water or wine have diſſolved all this Salt, and then dry it and caſt it into the flame, and it ſhall not burn, but the liquor will have a ſtrong taſte from this Salt. And this is it which opens obſtructions. The aſtringent quality lyeth in the terreſtrial ſubſtance, as is evident, after either, by infuſions, or by calcination, the volatile ſalt is departed from it, that which remains, is very aſtringent, and ſtayeth all manner of fluxes, &c.

Solinander, pag. 193. *Venuſtus, pag.* 159. *Baccius lib.* 6. *cap.* 3. *Savonarola. Renodæus pag.* 305.

Concerning Bathes participating with Iron, we have too many examples of them for *Fallopius* to contradict. We may let him injoy his opinion of the *Calderiana, Veronenſia & Villenſia Lucenſia*; although it be againſt the judgement of all other who have written of them, and it is hard for him to be confident in a negative. We have examples more then enough to prove the quality of Iron in our mineral waters. *Balneum Reginæ in agro Piſano* is actually hot, and from Iron. So is *Balneum Sancti Caßiani in agro Senenſi*: So is *Balneum Ficuncellæ, de Ruſſellis, Bora in agro Florent. Brandulæ in agro Regienſi, Viſicatoriæ in Tuſcia, Iſenbrun* by *Liege, Forgenſe* in *Normandy*: the *Spaw-water, Tunbridge-water, Briſtol-water* by *S. Vincents* Rock; all which, ſome being hot, and ſome cold, participate with Iron, as may be proved, not only by the conſent of all writers, which have made mention of them, but by the Mines from whence they come, or by their taſte, or by their virtues.

Copper

Quality of Copper.

Copper comes neareſt to the nature of Iron, but is more pure, and more eaſie of fuſion, and will be almoſt all converted into Vitriol. They are convertible the one into the other, as I have ſhewed out of *Erker*, in Vitriol. And by the practice at *Commatam* and *Smolnicium*. The like alſo hath been ſhewed in *Cornwall*, at the Confluence by Maſter *Ruſſel*. *Ariſtotle* alſo ells of a Copper Mine in *Thalia*, an Iſland of he *Tyrrhen* Sea, which being wrought out, urned into an Iron Mine: in this ſimilitude of nature, we cannot but judge that there is a ſimilitude in qualities, and that Iron being cold, Copper cannot be hot. Temperate it may be, becauſe leſs aſtringent then Iron, and more leanſing: *Rhaſis* ſaith that it purgeth like a Catharticum, aud in his continent, preſcibes it to urge water in Dropſies. Another argument that ll purgatives are not hot: it dryeth exceedingly, and attenuates and digeſts. We have divers aters which participate with it, which if they e pure from Copper it ſelf, are very ſafe and holſome: but if they be foul, and proceed from he excrements of Copper, they are not wholome to drink. *Balnea Collenſia ſeu ferina in Martiana Silva*, do conſiſt in Copper and Alum. The Bath of *Faberia* in *Rhetia*, of Copper and Gold. *Aqua de Grotta in agro Viterenſi*, is full of Copper; ſo is *Aqua Jaſielli*, *alneum Lucenſe in Valeſiis*: *Marcus Paulus enetus*, tells us of a greeniſh Fountain in *Per*ſi, which purgeth exceedingly, and is held to me from Copper.

Libav. de nat. metall. c. 10.

Of Tin.

Tin and Lead are two of our Staple Commodities which our Countrey yields plentifully, not only for our own uſe, but to ſupply other Nations. Tin is bred in *Cornwall*, and part of *Devonſhire*, and in the Iſles of *Scilly*, which from thence were called *Caſſiterides*. It is melted out of little black ſtones, which the Dutch call *Zwitter*, with great charge, becauſe they cannot melt it, but with wood coals, which is brought them far off, and they are fain to run it over two or three times, before they can get out all the Tin, and yet much of it is waſted in the blaſt. I doubt not but it might be done with Sea-coal, if they knew the Artifice, and with as great a product of Tin. There is both Silver and Gold found in it, but without waſting of the Tin, we know no means to ſever it. It is in quality cold and dry, and yet moves ſweat abundantly, as I have proved.

Of Lead. Lead is melted commonly out of an Oar common to Silver and Lead, as *Pliny* ſaith called *Galena*. And although *Agricola* ſaith of the villachar Lead, that it holds no Silver; and therefore fitteſt for aſſayes; yet *Lazarus Erker* contradicts it out of his own experience. Our Countrey abounds with it every where, eſpecially at the Peak in *Darbiſhire*, and at *Mendip* in *Somerſetſhire*; *Wales* alſo and *Cornwall*, and *Devon*, are full of it, and ſo is *Yorkſhire* and *Cumberland*. The qualities of it are cold and dry. But for theſe two metals, we find no waters which are infected with them. In *Lorain*, they have Bathes called *Plumbaria*, which ſome think by reaſon of the name, to proceed from Lead: but *John Bauhinus* thinks they ſhould be called

Pag. 90.

called *Plumiers*, as *Pictorius* writes it from the French word *Plumer, a deplumando*, becauſe they are ſo hot as they uſe to ſcald fowls in them, to take off their feathers.

Thus much for metals, and all other ſorts of Minerals, with their ſeveral Natures and Baths infected with any of them. As for mixed bodies, and flores, and recrements, &c. they are to be referred to the ſimple bodies from whence they proceed: As *Tutia, Pompholix, Minium, Ceruſſa, Sublimatum, Præcipitatum, &c.*

CHAP. XI.

Of the generation of Metals in the Earth; Their ſeminary ſpirit, That it is not from the Elements.

NOw I muſt ſhew the generation of theſe minerals in the bowels of the earth, which of neceſſity we muſt underſtand, before we can ſhew the reaſons how mineral waters receive either their actual heat, or their virtues.

Fallop. de metallis cap. 11. *Libav. de nat. metal. cap.* 12.

Some have imagined that metals and minerals were created perfect at the firſt, ſeeing there appears not any ſeed of them manifeſtly, as doth of Animals and Vegetables; and ſeeing their ſubſtances are not ſo fluxible, but more firm and permanent. But as they are ſubject to corruption in time, by reaſon of many impurities, and differing parts in them, ſo they had need to be repaired by generation.

It appears in *Geneſis*, that Plants were not created perfect at firſt, but only in their Seminaries: for *Moſes Cap.* 2. gives a reaſon why Plants were not come forth of the earth, *ſcil.* becauſe (as *Tremelius* tranſlates it) there had as yet neither any rain fallen, nor any dew aſcended from the earth, whereby they might be produced and nouriſhed: The like we may judge of minerals, that they were not at firſt created perfect, but diſpoſed of in ſuch ſort, as they ſhould perpetuate themſelves in their ſeveral kinds. Wherefore it hath ever been a received *Axiome* among the beſt Philoſophers, that minerals are generated, and experience hath confirmed it in all kinds. Our Salt-peeter men find that when they have extracted Salt-peeter out of a floor of earth one year, within three or four years after, they find more Salt-peeter generated there, and do work it over again. The like is obſerved in Allum and Copperaſs.

Agricola de ortu & cauſis Subt. lib. 5. *c.* 1.

As for metals, our Tinners in *Cornewall* have experience of Pits which have been filled up with earth after they have wrought out all the Tin they could find in them; and within thirty years they have opened them again, and found more Tin generated. The like hath been obſerved in Iron, as *Gaudentius Merula* reports of *Ilva*, an Iſland in the Adriatick Sea, under the Venetians, where the Iron breeds continually as faſt as they can work it, which is confirmed alſo by *Agricola* and *Baccius*; and by *Virgil*, who ſaith of it,

Lib. 3. *c.* 19.

Æn. lib. 10.

Inſula inexhauſtis Chalybum generoſa metallis;

Brave *Ilva* Iſle, whoſe teeming womb,
Breeds Iron till the day of Doom.

The like we read of at *Saga* in *Lygiis*, where they dig over their Iron-mines every tenth year. *John Matheſius* gives us examples almoſt of all ſorts of minerals and metals which he hath obſerved to grow and regenerate. The like examples you may find in *Leonardus Thurneiſerus*. *Eraſtus* affirms that he did ſee in S. *Joachims* dale, ſilver grown upon a beam of wood, which was placed in the pit to ſupport the works: and when it was rotten, the workmen coming to ſet new timber in the place, found the ſilver ſticking to the old beam. Alſo he reports that in *Germany*, there hath been unripe and unconcocted ſilver found in Mines, which the beſt workmen affirmed, would become perfect ſilver in thirty years. The *like Modeſtinus Fachius*, and *Matheſius* affirm of unripe and liquid ſilver; which when the workmen find, they uſe to ſay, *We are come too ſoon*. But I need not produce any more proofs for this purpoſe, as I could out of *Agricola* and *Libavius*, and others, ſeeing our beſt Philoſophers, both antient and modern, do acknowledge that all minerals are generated. The manner of generation of minerals and metals, is the ſame in all, as is agreed upon both by *Plato* and *Ariſtotle*, and *Theophraſtus*.

In Sarept. conci. 3. 11. *&c.*

In Alchimia magna.

De metallis pag. 17. *&* 19.

Von probiernng der ertze.

In Sarepta.

Sebaſt. Foxius l. 3. *c.* 6.

Severinus c. 8. *p.* 125.

And as the manner of generation of minerals is alike in all, ſo it differs from the generation of animate bodies, whether animals or vegetables, in this, that having no ſeed, they have no power or inſtinct of producing other individuals, but have their ſpecies perpetuated *per virtutem ſeu ſpiritum ſemini analogum*, by a ſpiritual ſubſtance proportionable to ſeed, which is not reſident in every individual, as it is in animals and plants, which *Moſes* ſaith have their ſeeds in themſelves, but in their proper wombs. This is the judgement of *Petrus Severinus*, howſoever he doth obſcure it by his Platonical grandiloquence. And as there is not *Vacuum in Corporibus*, ſo much leſs in *Speciebus*: For that the Species are perpetuated by new generations, is moſt certain, and proved before; that it is not out of the ſeeds of individuals, is evident by this, that if minerals do not aſſimulate nouriſhment by attraction, retention, concoction, expulſion, &c. for the maintenance of their own individual bodies, much leſs are they able to breed a ſuperfluity of nouriſhment for ſeed. And how can they attract and concoct nouriſhment, and expel excrements, which have no veins nor fibres, nor any diſtinct parts to perform theſe Offices withal? Moreover they are not increaſed as Plants are, by nouriſhment, whereas the parts already generated, are extended in all proportions by the ingreſſion of nutriment, which fills and enlarges them: but only are augmented externally upon the ſuperficies, by ſuper-addition of new matter concocted by the ſame virtue and ſpirit, into the ſame Species.

Cæſalpinus de metal. lib. 1. *c.* 2.

Cap. 2.

Eraſt. diſput. part. 2. *p.* 261.

Thus much for the manner of all mineral generations, which is not much controverted: the chief difference is about the efficient and the matter. About the efficient cauſe of generations (for we muſt handle them all together) there are divers opinions, as there are divers cauſes which concur to all generations of animals, vegetables or minerals. But there muſt be one principal efficient cauſe, to give the form to all Species, as there are other adjuvant and attending cauſes: The principal cauſe and agent in this work, is by moſt attributed to the influence of the Planets, eſpecially to the Sun, who either by his light, or by his heat, doth frame the ſpecies of all things, and ſo of minerals, but chiefly in regard of his heat. This heat working upon apt matter, is thought to produce the ſeveral ſpecies which we ſee. As for the motion of the Planets, it is certain that they move continually in a conſtant order, and the World could not ſubſiſt as it doth without it, ſo as it may be *cauſa ſine qua non*; a very remote cauſe, as there may be a hundred more cauſes of that nature. So likewiſe the light, which the Peripateticks make the inſtrument of cœleſtial effects, can do as little to the furtherance of generations, ſeeing they proceed as well by night as by day: and for minerals, it is perpetual night with them, the denſity of the earth and rocks not ſuffering the light to paſs. Wherefore they inſiſt chiefly upon the heat of the Sun: but *Moſes* tells us that Plants were created with their ſeeds in themſelves upon the third day, before the Planets, which were not created till the fourth day; to ſhew us that Plants and terreſtrial ſubſtances depend not upon Planets for their generations, nor for their virtues, but have the principal

The principal Efficient Cauſe of the Generation of Minerals, not the Sun.

Dorn. phiſica Geneſis.

cipal cauſes of them in themſelves. The ſame we may judge of minerals, being terreſtrial ſubſtances, and propagated by ſeeds, as Plants are, and likely to be created upon the ſame day with Plants, ſeeing there is no other mention of their creation in *Moſes.*

Now for the heat of the Sun, no doubt it is an univerſal fosterer of all inferior ſubſtances: but that it ſhould beget particular Species, is very improbable. The heat of the Sun is no more apt to breed a Nettle than a Dock, Brimſtone than Salt, &c. For it cannot give the eſſence to any thing: heat being only a quality which can breed no ſubſtance, and ſuch a quality as can only ſegregate heterogeneal ſubſtances, and thereby congregate homogeneal. Whereas in all generations there muſt be a further power and virtue, to proportion the Elements fit for every Species (if they will have all things made of the Elements) and to bring the Species from a potential being to an actual, giving to every thing his proper ſhape, quantity, colour, ſmell, taſte, &c. and to unite them, which before were of different natures: It muſt be an internal and domeſtical agent, and efficient cauſe which muſt perform this: and ſuch a one as is not common to all Species alike, but proper to that which it produceth: otherwiſe there would be no diſtinction of Species. And therefore *Moſes* ſaith of Plants, that they have their ſeeds in themſelves, according to their ſeveral kinds. Neither can any external cauſe give an eſſential form to any thing, which form muſt be αὐτοφυὴς, inbred in the thing it ſelf, and not adventitious. And therefore *Sca-*

Gal. de Maraſ.

liger ſaith, *Formæ, non Solis eſt quantitatem terminare*, and *Ariſtotle*, *Calore natura utitur tanquam miniſtro aut inſtrumento, non tanquam opifice aut legiſlatore.* Wherefore we will grant the Sun to be an adjuvant cauſe, and by his heat to foſter and cheriſh inferiour generations: but not to be a principal and begetting cauſe. And ſo *Zabarella* doth mollifie the harſhneſs of the former opinion: and doth acknowledge that the Sun doth further generations only as an inſtrument of another ſuperiour power, whereby in minerals it may make the matter more apt to receive the form, but it makes no minerals, no more then it makes blood in our bodies.

De calore.

Neither the Elements.

Others make the Elements to be the principal cauſes of all ſpecies by their qualities. For the matter of the Elements, being a paſſive matter, cannot be an efficient cauſe of generations. Theſe qualities muſt be heat or cold: for the other two are paſſive, and attend rather upon the matter of generations, then upon the efficient. Fire therefore by his heat is thought of all the Elements to have the greateſt hand in all generations, being moſt active and ſuperiour to all the reſt of the Elements together, for the generation of every Species, and rank them in due order, proportion, weight, meaſure, &c. This is he than muſt reconcile the differences which are in their natures, and bring them to union. This muſt attract nouriſhment, and preſcribe the quantities, dimenſions, parts, figures, colours, taſtes, ſavours, &c. of every thing. A large Province he hath to govern, with one naked and ſimple quality, which can have but one ſimple motion. *Simplicibus corporibus ſimplices tantum motus congruunt.* Heat can but heat, and the effects of this heat are by ſeparation of different ſubſtances, τῶν ἀλλοφύλων to congregate thoſe that are alike, τὰ ὁμόφυλα: But in this work we make heat to unite differing ſubſtances: for all generation is of differing ſubſtances united into one. Again, fire having but one quality to work withall, whereby he muſt unite the other three Elements, what ſhall bring and unite fire unto them? This muſt be another power ſuperiour to them all, for we muſt not imagine that they meet by chance as travellers do. And therefore *Ariſtotle* explodes this efficient of fire, and attributes it to the forms of natural things.

1 De anima Item 2. cap. 4.

As for cold in the other Elements, it is far more unlikely then heat, to perform theſe offices, being rather a deſtructive, then a generative quality, and is not called in by any Author to this work, before the ſpecies have received his form by heat: and then it is admitted only for conſolidation, but how juſtly, it is doubtfull: for heat doth conſolidate as well as cold, by drying up moiſture. But we will not grant this to either of them, as principal Agents, but as they are inſtruments attending the forms of natural things.

The Alchymiſts make Sulphur to be the principal efficient of all minerals, eſpecially of metals, and Mercury the matter. If they mean common Sulphur and Mereury, which are perfect Species in their kinds, they are much deceived, and this opinion is ſufficiently confuted by all that oppugne them. But it ſeems they underſtand ſome parts in the ſeminary of metals which have ſome analogy with theſe: and ſo their opinion may be allowed. For the ſpirit, which is the efficient in theſe generations, doth reſide in a material ſubſtance, which may be reſembled to Sulphur or Oyle, as ſome other part may be reſembled to Mercury. For all generations are framed of different parts united by this Spirit. Thus much of the different opinions concerning the efficient of all generations, and in particular of minerals. The matter whereof minerals are bred, is attributed chiefly to the Elements, as the general matter of all animate and inanimate bodies: inſomuch as both the heavens, and the very ſouls of men are made to proceed from the Elements.

Concerning the Heavens, it hath been the ancient opinion of the *Platonicks*, *Pythagoreans*, and *Epicureans*, that not only theſe inferiour bodies, but alſo the cœleſtial, have been framed out of the Elements. *Plato* ſpeaking of the heavens, ſaith, *Divini decoris ratio poſtulabat talem fieri mundum, qui & viſum pateretur & tactum. Sine igne videri nil poteſt, ſine ſolido nil tangi: ſolidum ſine terra nihil.* Wherefore holding the heavees to be viſible and ſolid, they muſt be made of the Elements. The *Pythagoreans*, and the *Brachmanni* of *India* held the ſame opinion of the Heavens: where *Apollonius Tyanæus* was inſtructed in all the *Pythagorean* Doctrine, as *Philoſtratus* reports. The *Epicureans* alſo were of the ſame opinion, as appears in *Virgil*, where he brings in *Silenus*, one of the ſect, and one of *Bacchus* his crew, ſinging in this manner,

Triſmegiſtus in Aſclepio cap. 1.

Plato.

In Timeo in Dialogo de natura.

In vita Apollonci.

Elcoga 6.

Namque canebat, uti magnum per inane coacta
Semina, terrarumque, animæq; mariſq; fuiſſent,
Et liquidi ſimul ignis: ut his exordia primis
Omnia, & ipſe tener mundi concreverit orbis.

Silenus ſung, how through the Chaos vaſt,
The ſeeds were ſet of Earth, of Air, of Seas,
Of pureſt fire: how out of theſe at laſt,
All things have ſprung, and alſo out of theſe
The infant world was moulded.

De ſacra Philoſoph. cap. 51.

Of this opinion alſo was *Lucretius*, *Philo Judæus*, *Valeſius*, &c. although *Valeſius* doth make more pure Elements for the Heavens then ours. *Ariſtotle* forſook his Maſter *Plato* in this point, and frames the Heavens of a quinteſſential ſubſtance.

But howſoever the Heavens may participate with elementary qualities, and be ſubject to generation and corruption in their parts; yet methinks they ſhould exempt our ſouls from this original, and not make them out of the fragments of the Elements.

Cap. de mixtione.

Scaliger inveys againſt *Alexander Aphrodiſienſis*, for this opinion, and ſaith that he hath poyſoned our Philoſophy herein: *Venenavit hanc Philoſophiæ partem.* So both he and others derive the ſenſe, motion, underſtanding, growth, and the natural faculties of our ſouls, and the peculiar properties of every thing, from this original, *turpiſſimo errore*, as *Severinus* ſaith. And *Scaliger* in another place concerning this: *De intellectu & ratione ipſaque anima quæ contami-*

narunt

runt iſtæ nebulæ Aphrodiſienſes, & pudet dicere piget meminiſſe. I am aſhamed to ſpeak, and ieved to think how this *Aphrodiſienſis* hath polted our reaſon and underſtanding, and our very uls with his foggy doctrine, in aſcribing all eſe unto the Elements. By the ſame reaſon ey may aſcribe the barking of Doggs, the ſingg of Birds, the laughing and ſpeech of men, to e Elements. Their opinion is more probable, hich hold, *animam ex traduce*, and to be comunicated as one light to another: as *Timoth. right* proves in *Phyſicam Scribonii*, and not to cribe it to the Elements, nor to miracles, or ew creations. But there is far more reaſon to erive from the Elements, the taſtes, colours, ells, figures, numbers, quantities, orders, dienſions, &c. which appear more in corporal bſtances, and yet theſe are not from the Elements. For how can they give theſe affections other things, when they have them not themlves? *Si non eſt ab elementis guſtare, quare ſit ſtari?* What taſte have any of theſe Elements? Fire or heat which is the moſt active lement, hath none. And whereas it is thought, at bittterneſs proceeds from heat, we find at many ſharp and tart fruits, being alſo very tter before they are ripe, (as Olives for exnple) yet let them hang upon the tree till they e ripe, and they loſe their bitterneſs, and alſo eir ſharpneſs, by reaſon of their better conction by heat. The like difference we find etween our *oleum omphacinum*, and therpe yle. So likewiſe *opium*, which is held to be ery cold; yet it is extream bitter, ſo as the cold parts in it are not able to maſter the bitterneſs, but this is ſtill predominant: wherefore heat can be no cauſe of bitterneſs, unleſs it be in exceſs or defect, as *Scaliger* confeſſeth. Wormwood is very bitter, being hot and dry in the ſecond or third degree: if heat were the cauſe of it, then all other ſimples which are hot and dry in the ſame degree, ſhould be alſo bitter. As I have ſaid of taſtes, ſo I may ſay of all the other affections of natural things, that they proceed not from the Elements, but from the ſeeds and forms of every thing. So for fat and unctuous ſubſtances, as Sulphur, Bitumen, Oyle, Greaſe, &c. unto what Element ſhall we aſcribe them? Not unto fire, becauſe this is extream hot and dry, that is temperate in heat, and very moiſt. Moreover, fire would rather conſume it, then generate it: and Phyſitians judge the generation of fat in our bodies to proceed rather from cold, then from heat. Air, if it have any ingenerate quality, as ſome do make doubt out of *Ariſtotle* it is cold and moiſt, as I have ſhewed before, *cap.* 2. & 5. and therefore as it cannot agree with fire, nor be a fuel to it, ſo it cannot be any material cauſe of fat, or oylie ſubſtance: being more agreeable to water, from whence it is thought to be made by rarifaction, and into which it is thought to be reduced by condenſation. Wherefore being of a watry nature, it cannot agree with oyle or fatneſs, nor be the matter of it. The like we may judge of water, which doth terminate both water and air, and therefore muſt be oppoſite to them both. As for earth, being cold and dry, and ſolid, it cannot be the

1 Meteorol. 4. Item de mundo ubi dicit aerem comparatum eſſe ad aliam & aliam naturam inducendam.

matter

atter of this which is temperate, and moiſt, nd liquid; Neither can all the Elements toge-her make this ſubſtance, ſeeing there is no un-tuouſneſs in any of them, and they can give no ore then they have. So as I cannot ſee how his oylie ſubſtance, which is very common in ll natural things, and wherein the chief facul-ies of every thing doth reſide, as their *humium radicale*, ſhould be from the Elements.

So likewiſe for the ſubſtance wherewith every ing is nouriſhed and increaſed, and into which very thing is reſolved, it appears not how it hould be from the Elements. *Hypocrates*, of hom *Macrobius* ſaith, *Nec fallere nec falli tuit*, hath two notable axioms for the clearing f this point. The one is *Vnumquodq; in id diſolvitur unde compactum eſt.* Every thing is iſſolved into that whereof it was made. The ther, *Iiſdem nutrimur ex quibus conſtamus*, we re nouriſhed by ſuch things as we conſiſt of. *Ariſtotle* alſo hath the ſame. If this axiom be ue, as I hold it to be, and I know none that ontradict it, then we muſt conſiſt of ſuch things s we are nouriſhed withall. But we are not ouriſhed by the Elements, and therefore we onſiſt not of them. Fire nouriſheth nothing, ater nouriſheth not, as Phyſitians confeſs: ir is too thin a ſubſtance, and Earth to thick. nd as they do not nouriſh them when they are ngle, ſo being compounded, they can do as ttle. *Ariſtotle* ſaith that ſome Plants are nouſhed with water alone, ſome with earth alone, nd ſome with both together. But if earth and ater be mixed for our nouriſhment, they making

In ſom. Scipionis cap. 6.

De nat. hominis.

2 *De gen. cap. 8. Item lib. de ſenſu & ſenſibile.*

3 *De gen. animal. cap. ultimo.*

but mud, would make us have muddy brains. We will grant the Elements to be *matrices rerum naturalium*, the wombs and nurſes of natural things, but we will not grant them to be material cauſes. Neither can we attribute more dignity unto them, then we do to our Mothers, who depart from their ſubſtance whereof they conſiſt, as fleſh, bones, ſinews, veins, arteries, &c. to the nouriſhment of their Infants, but only prepare blood for them, from the nutriments which they receive. And all the Elements in the world cannot make this blood, neither as the matter nor as the efficient. But as the Mother is furniſhed with blood to nouriſh the Infant, and with convenient heat to foſter it withall, ſo are the Elements ſtored with all manner of matter fit for all generations: ſo as the ſeeds or forms of natural things, will never want matter to nouriſh them, nor will ever want forms. So that it is manifeſt that if natural bodies be not nouriſhed by the Elements, they are not compounded of them: but being nouriſhed by other ſubſtances then the Elements, they muſt be compounded of the like; *Simile ſimili nutritur: compoſita compoſitis conſtant & nutriuntur.*

Thus much for the Geneſis or generation and natation of natural things, that thereby we cannot gather that they are either made or nouriſhed by the Elements. Now let us examine whether by the Analyſis or diſſolution of them, we may find the four Elements, according to the former axiome, that every thing is diſſolved into that whereof it was made, and is made of that whereinto it is diſſolved, as *Ariſtotle, Hypocrates,* *es*, and *Galen* do affirm. So that if the Ele- ts enter into the compoſition of natural gs, eſpecially as the principal materials reof they conſiſt, they muſt needs appear he diſſolution of them. This diſſolution is er natural or artificial. In the natural diſſo- on of all things, *Hypocrates* obſerves three nct ſubſtances, *calidum, humidum ſive flui-* , *& ſiccum ſive ſolidum*, according to the e Elements or principles whereof they are ed. His inſtance is principally man, but he ns it to hold in other animate and inanimate es. Theſe Elements he termeth *continen-* *contenta & impetum facientia*, as *Galen* ex- nds it. Thoſe which he calls *continentia*, bones, nerves, veins, arteries, and from ice, muſcles, &c. *Contenta* are *humida*, *umores*, blood, flegme, choller, melancholy, ch after death, are cold, and congeal, being ed as *Galen* ſaith, from the heart, in living ies: *Impetum facientia*, are ſpirits animal, l and natural.

Iſagoge cap. 8.
1 de Elementis cap. 15.

heſe three Elements, *Galen* acknowledgeth e the neareſt, but the other which are more ote, to be moſt univerſal. But *Hypocrates* n that heat and cold, &c. are very powerleſs ments, and that ſharp, bitter, ſweet, &c. are e powerfull, τὴν μεγάλην δύναμιν ἔχοντα. that theſe are the three Elements whereof things do conſiſt, and into which they are urally reſolved: and theſe do ſeem to re- ble the four Elements, but are not the ſame. heat may reſemble fire, although this heat be cured by motion in every thing whileſt it liveth,

De veteri medicina.

liveth, and not extrinſecally. Moiſture may reſemble water and air. Drineſs may reſembl earth ; cold appears in them all after the heat o ſpirit is departed.

In the artificial Analyſis of natural bodies, th Alchymiſts tells us that they find three Elements, and no more, whereof every thing dot conſiſt, and whereinto it is reſolved: namely *Vaporoſum, inflammabile, fixum:* which the call Mercury, Sulphur and Salt, and they ſeem t agree with *Hypocrates.* For their Mercury ma well reſemble *Hypocrates* his ſpirits, or *impetu facientia*: Sulphur his humour or *fluidum* or *contenta*: and Salt, his *ſiccum* or *denſum*, or *continentia.* Theſe they ſay are found in every thing animal, vegetable, or mineral, and no othe And as for the four common Elements, ſeein they are diſtinct in place and ſcituation, an therefore cannot concurre and meet to the generation of every animal, Plant and Mineral, &c but by violence, the earth being ſometime carried upwards, and the fire downwards, contrary to their natural motions: and this, not onc for all, but daily and hourly: it is not likely th theſe ſubſtances can be bred of the Elements, o be maintained in a perpetual ſucceſſion by a violent cauſe. And therefore it is no marvel theſe Elements be not found in the diſſolution natural bodies. Thus much in general concerning all generations, that hereby we may the better judge of the particular generations of Minerals, which differ not from the reſt, but on in this, that their ſeeds are not in every indiv dual, as the others are, but are contained

matricibu

atricibus, in their wombs, and there they are rniſhed with matter to produce their Species : ot out of the Elements, no otherwiſe than *ex atricibus*, as the child in the mothers womb, it have their matter and nouriſhment from the eds of things which are agreeable to their ecies : which ſeeds wanting means to produce eir own ſpecies, do ſerve others, and yield atter and ſubſtance unto them.

Now let us come more particularly to the ge- ration of minerals, wherein we will firſt ex- nine *Ariſtotles* opinion, as moſt generally re- ived, then I will preſume to ſet down mine vn.

CHAP. XII.

he generation of Minerals examined, the Authors opinion herein.

A*Riſtotle* makes the humidity of water, and the dryneſs of earth, to be the matter of all nerals : the dryneſs of earth to participate th fire, and the humidity of water with air, as *abarella* interprets it ; ſo that to make a perfect xt body, the four Elements do concur ; and to ke the mixture more perfect, theſe muſt be re- ved into vapour or exhalation by the heat of e, or influence from the Sun and other Planets, the efficient cauſe of their generation : but cauſe of their congelation to be cold in ſuch dies as heat will reſolve. This vapour conſi- g partly of moyſture, and partly of dryneſs, if

Eraſtus, Carerius, Cæſalpinus, Martinus, Moriſinus, Foxius, Magyrus, Libavius.

if all the moyſture be ſpent, turns to earth or ſalt, or concrete juyces, which diſſolve in moyſture: if ſome moyſture remain before congelation, *3 Meteor. c. ult. Cæſalp. l. 3. c. 1.* then it turns to ſtone: if this dry exhalation be unctuous and fat, and combuſtible, then Bitumen and Sulphur, and Orpiment, are bred of it: if it be dry and incombuſtible, then concrete juyces, &c. But if moyſture do abound in this vapour, then metals are generated which are fuſible and malleable. And for the perfecting of theſe generations, this exhalation is not ſufficient, but to give them their due conſiſtence, there muſt be the help of cold from Rocks in the earth to congeal this exhalation. So that here muſt be two efficients, heat and cold. And for the better effecting of this, theſe exhalations do inſinuate themſelves into ſtones, in the form of dew o froſt, that is, in little grains; but differing from *Libav. de nat. metall. c. 14. Carerius 178. Septal. in Hipp. de aëre, aqu. &c.* dew and froſt in this, that theſe are generated af ter that the vapour is converted to water; whereas Minerals are generated before this converſio into water. But there is doubt to be made (froſt, becauſe that is bred before the converſio of the exhalation into water, as may appear, *Meteor.* 1. According to this aſſertion there muſt b two places for the generation of minerals; th one a *matrix*, where they receive their eſſen by heat in form of an exhalation, and from then they are ſent to a ſecond place to receive the congelation by the coldneſs of Rocks: and fro this *matrix* come our mineral waters, and n from the place of congelation.

This is the generation of minerals, accordi to *Ariſtotle*; but it is not ſo clear, but that

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leaves many ſcruples, both concerning the matter, and the efficients. For the matter, it ſeems not probable, that water and earth ſhould make any thing but mud and dirt; for you can expect no more from any thing than is in it, the one is cold and dry, the other cold and moyſt; and therefore as fit to be the matter of any other thing, as of particular minerals. And water, whereof principally metals are made to conſiſt, is very unfit to make a malleable and extenſible ſubſtance, eſpecially being congealed by cold, as we may ſee in ice. But ſome do add a mineral quality to theſe materials, and that ſimple water is not the chief matter of metals, but ſuch as hath imbibed ſome mineral quality, and ſo is altered from the nature of pure water. This aſſertion doth preſuppoſe minerals in the earth before they were bred; otherwiſe what ſhould breed them at the firſt, when there was no mineral quality to be imparted to water? Again, this mineral quality either gives the water or the vapour of it the eſſence of the mineral, and then it is not the effect of water, but of the mineral quality, or the potential faculty to breed it. If the eſſence, then this metalline water, or vapour, muſt have the form of the metal, and ſo be fuſible and malleable. If it have only the power and potential faculty, then the generation is not perfected, but muſt expect further concoction. This concoction is ſaid to be partly by heat, and partly by cold; if by heat, it muſt be in the paſſages of the exhalation as it is carried in the bowels of the earth: for afterwards, when the exhalation is ſetled in the ſtones, the heat is gone.

Now if the concoction be perfected before the exhalation be inſinuated into the Stones, as it muſt be, if it be like dew, then it is perfect metal, and neither is able to penetrate the Stones, nor hath any need of the cold of them to perfect the generation. If by cold, it is ſtrange that cold ſhould be made the principal agent in the generation of metals, which generates nothing; neither can heat be the efficient of theſe generations. Simple qualities can have but ſimple effects, as heat can but make hot, cold can but cool, &c. But they ſay cold doth congeal metals, becauſe heat doth diſſolve them; I anſwer, that the rule is true, if it be rightly applyed: as we ſee ice which is congealed by cold, is readily diſſolved by heat. But the fuſion of metals cannot properly be called a diſſolution by heat, becauſe it is neither reduced to water or vapour, as it was before the congelation by cold, nor is it permanent in that kind of diſſolution, although after fuſion it ſhould be kept in a greater heat than the cold could be which congealed it. For the cold in the bowels of the earth cannot be ſo great, as it is upon the ſuperficies of the earth, ſeeing it was never obſerved that there was any ice bred there. Alſo this diſſolution which is by fuſion, tends not to the deſtruction of the metal (but doth rather make it more perfect) as it ſhould do according to the former rule rightly applyed. And therefore this diſſolution by fuſion, doth not argue a congelation by cold; which being in the paſſive elements, doth rather attend the matter than the efficient of generations: for it is apt to dull and hebetate all faculties and motions

Valeſius ſacra Philoſoph. c. 49.

motions in nature, and ſo to hinder generations, rather than to further any. It is heat and moyſture that further generations; as *Ovid* ſaith;

Quippe ubi temperiem ſumpſere humorque calorque, Concipiunt:

When heat with moyſture's temper'd well,
Then 'tis their bellies 'gin to ſwell.

And thus much for *Ariſtotles* generation of minerals, where his vapours or exhalations do rather ſerve for the collection or congregation of matter in the Mines, than for the generation of them; as *Libavius* doth rightly judge. *Agricola* makes the matter of minerals to be *Succus Lapideſcens Metallificus, &c.* and with more reaſon, becauſe they are found liquid in the earth: *Gilgill* would have it Aſhes; *Democritus* Lime: but theſe two being artificial matters, are no where found in the earth. The Alchymiſts make Sulphur and Mercurie the matter of metals: *Libavius,* Sulphur and Vitriol. But I will not ſtand upon diſcourſing of theſe materials, becauſe it makes little to my purpoſe. It is enough for my purpoſe to ſhew the manner of theſe generations, which I take to be this.

Singularium lib. 1. part. 1.

De nat. metall. cap. 10.

The Authors opinion concerning the manner of the Generation of Minerals,

There is a Seminarie Spirit of all minerals in the bowels of the earth, which meeting with convenient matter, and adjuvant cauſes, is not idle, but doth proceed to produce minerals, according to the nature of it, and the matter which it meets withal; which matter it works upon like a ferment, and by his motion procures an actual heat, as an inſtrument to further his work ; which actual heat is increaſed by the fermentation of the matter. The like we ſee in making of Malt, where the grains of Barley being moiſtned with water, the generative Spirit in them is dilated, and put in action ; and the ſuperfluity of water being removed, which might choak it, and the Barley laid up in heaps ; the ſeeds gather heat, which is increaſed by the contiguity of many grains lying one upon another. In this work natures intent is to produce more individuals, according to the nature of the Seed ; and therefore it ſhoots forth in ſpires : but the Artiſt abuſes the intention of Nature, and converts it to his end, that is, to increaſe the ſpirits of his Malt. The like we find in mineral ſubſtances, where this ſpirit or ferment is reſident ; as in Allum and Copperas Mines, which being broken, expoſed and moiſtened, will gather an actual heat, and produce much more of thoſe minerals, then elſe the mine would yield ; as *Agricola* and *Thurneiſer* do affirm, and is proved by common experience. The like is generally obſerved in Mines, as *Agricola, Eraſtus, Libavius, &c.* do avouch out of the daily experience of mineral men, who affirm, that in many places, they find their Mines ſo hot, as they can hardly touch them ; although it is likely that where they work for perfect Minerals, the heat which was in fermentation, whilſt they were yet breeding, is now much abated : the Minerals being now grown to their perfection. And for this heat we need not call for the help of the Sun, which a little cloud will take away from us, much more the body of the earth, and rocks; nor for ſubterranean fire: this inbred heat is ſufficient, as may appear alſo by the Mines of Tinglaſs, which being digged, and laid in the moiſt air, will become very hot. So Antimony and Sublimat being mixed together, will grow ſo hot as they are not able to be touched: If this be ſo in little quantities, it is likely to be much more in great quantities and huge rocks. Heat of it ſelf differs not in kind, but only in degree, and therefore is inclined no more to one Species, then to another, but as it doth attend and ſerve a more worthy and ſuperiour power, ſuch as this generative ſpirit is. And this ſpirit doth convert any apt matter it meets withall to his own ſpecies by the help of heat; and the earth is full of ſuch matter which attends upon the ſpecies of things: and oftentimes for want of fit opportunity and adiuvant cauſes, lies idle, without producing any ſpecies: but is apt to be tranſmuted by any mechanical and generative ſpirit into them. And this matter is not the Elements themſelves, but ſubterranean ſeeds placed in the Elements, which not being able to live to themſelves, do live to others. *Sic Roma creſcit Albæ ruinis*; the Death of one is the life of another. From this confluence of ſeeds ariſe all the varieties and differences, and alterations which are obſerved in the generation or nutrition of natural things: as in their colours, taſtes, numbers, proportions, diſtempers, &c. Alſo from hence proceed the Tranſplantations which we find in animals, vegetables, and minerals. In animals theſe Tranſplantations are not very

Muffetus in dialogo apologetico.

frequent; yet all our monſters may be referred hereunto, as alſo the iſſue which comes from Dogs and Wolves, Horſes and Aſſes, Partridges and Hens, &c. Some do think that the deſtruction of Sexes is a Tranſplantation; and that all ſeeds in themſelves are hermophroditical, and neither maſculine nor feminine, but as they meet with ſtrong and weak impreſſions from ſupervenient cauſes; From hence come our *Androgyni*, or maſculine women, ſuch as *Horace* ſpeaks of,

Carm. lib. 3. od. 6.

Sabellis docta ligonibus verſare glebas.

That dig the ground themſelves (ſtout Jades!)
Managing well *Sabean* Spades.

Among thoſe Animals which we call *Inſecta*, theſe Tranſplantations are more frequent, becauſe their ſeeds are more equivocal, and eaſily tranſmuted from one ſpecies to another: as we may ſee in Worms and Flies, and moſt evidently in Silk-worms called *Cavallieri*.

In Vegetables theſe Tranſplantations are very frequent when one ſpecies is grafted upon another, as *Virgil* ſaith,

Georg. 2.

Et ſteriles platani malos geſſere valentes
Caſtaneæ fagos: ornuſque incanuit albo
Flore pyri, glandemque ſues fregere ſub ulmis.

The barren Planes did Apples bear;
The Beeches Cheſnuts, th' Aſh a Pear;
And Hogs did under Elm-trees Acorns tear.

Thus by commixtion of ſeveral ſpecies, the firſt ſeeds do oftentimes bring forth other fruits then their own,

Miranturque novas frondes & non ſua poma.

And ſtand admiring, double mute,
To ſee new leaves, and ſtranger fruit.

But all, as *Hypocrates* ſaith, by divine neceſſity, both that which they would, and that which they would not. So likewiſe Wheat is changed into *Lolium*, Baſil into Thyme, Maſterwort into Angelica, &c.

De Dieta 1.

In Minerals we find the like tranſplantations: as Salt into Nitre, Copperaſs into Allum, Lead into Tin, Iron into Copper, Copper into Iron, &c. And this is the tranſplantation whereupon the Alchymiſts ground their Philoſophers ſtone.

This Seminary Spirit is acknowledged by *Ariſtotle*: *Continent* (*inquit*) *ſemen in ſe cujuſq; fœcunditatis ſuæ cauſam*; and by moſt of his Interpreters: and *Moriſinus* calls it *Elpheſteria*, not knowing how to attribute theſe generations to the Elements. And this is the cauſe why ſome places yield ſome one vegetable or mineral ſpecies above another,

De gen. animal. lib. 2.

Foxius, Martinus, Moriſinus, Magyrus, Libavius, Velcurio, Valeſius, Caterius, Eraſtus, &c.

Quippe ſolo natura ſubeſt. Non omnis fert
omnia tellus.

It is the nature of the ground,
Not in all Soils are all things found.

This ſeminary ſpirit of minerals hath its proper wombs where it reſides, and is like a Prince or Emperour, whoſe preſcripts both the Elements and matter muſt obey; and it is never idle, but alwayes in action, producing and maintaining natural ſubſtances, untill they have fulfilled their deſtiny, *donec fatum expleverint*, as *Hypocrates* faith. So as there is a neceſſity in this, depending upon the firſt benediction (*creſcite & multiplicamini:*) and this neceſſity or *fatum* is inherent in the ſeeds, and not adventitious from the Planets, or any other natural cauſe. And this is the cauſe of uniformity in every ſpecies, that they have all their proper figures, dimenſions, numbers of parts, colours, taſtes, &c. moſt convenient and agreeable to each nature; as *Moſes* ſaith, that God ſaw that every thing was very good: and *Galen* ſaith, *Deus in omnibus optimum eligit.* And this I take to be the meaning of his *Lex Adraſtiæ*, which he alledgeth againſt *Aſclepiades.* For if he ſhould mean it as commonly it is underſtood, of puniſhment which alwayes follows ſin, *nemo crimen in pectore geſtat, qui non idem Nemeſin in tergo*; No man, though privately, commits a fault, but is dogg'd by revenge: in this ſenſe he could not apply it to the confuting of *Aſclepiades.* There are alſo other laws in nature which cannot be altered, both Mathematical, in Arithmetick and Geometry; and Logical, in the conſecuting of arguments, &c. But theſe ſerve not for *Galens* purpoſe in this place. He muſt mean it of a natural neceſſity or *fatum*, or predeſtination, that frames every member & part of the body

De Dieta lib. 1.

6 *De uſu partium c.* 12.& 13.

Eraſmus in Adagiis.

body to the beſt uſe for the creature. And thereore where *Aſclepiades* propounds an inconvenient frame of parts, he confutes him by this inbred law of nature, which he ſaith, no man can alter or avoid, nor any ſubtility elude, as alſo *Ariſtotle* ſaith. Thus much for the generation of Minerals and other natural ſubſtances.

De mundo.c.ult.

CHAP. XIII.

Of the cauſes of actual heat, and medicinal virtue in Mineral Waters, divers opinions of others rejected.

NOW I come to ſhew how our mineral waters receive both their actual heat, and their virtues. I joyn them together, becauſe they depend upon one and the ſame cauſe, unleſs they be juices which will readily diſſolve in water, without the help of heat: other minerals will not, or very hardly.

Cauſes of heat in mineral waters not.

This actual heat of waters hath troubled all thoſe that have written of them; and many opinions have been held of the cauſes of them.

Some attribute it to wind or air; or exhalations included in the bowels of the earth, which either by their own nature, or by their violent motion, and agitation, and attrition upon rocks and narrow paſſages, do gather heat; and impart it to our waters. Of their own nature theſe exhalations cannot be ſo hot, as to make our water hot, eſpecially ſeeing in their paſſage among cold rocks, it would be much allaied, having no ſupply

Wind, Air, Exhalations in the Earth.

ply of heat to maintain it. Moreover, where water hath paſſage to get forth to the ſuperficies of the earth, there theſe exhalations and winds will eaſily paſs, and ſo their heat gone withall, and ſo our waters left to their natural coldneſs: whereas we ſee they do continue in the ſame degree and tenor, many generations together. If by their agitation and violent motion they get this heat, becauſe no violent thing is perpetual or conſtant, this cannot be the cauſe of the perpetual and conſtant heat of water. Beſides, this would rather cauſe earthquakes and ſtorms, and noyſes in the earth, then heat our ſprings. Moreover, we daily obſerve, that exhalations and water are never heated by motion, or agitation; as in the Cataracts of the *Rhine* by *Splug*; the agitation and fall of water upon rocks is moſt violent, and makes a hideous noyſe; yet it heats not the water, though it be very deep in the earth. Neither can any attrition heat either air or water, or any ſoft and liquid thing, but rather make it more cold.

Agitation and violent motion.

Valeſius contro. lib. 4. cap. 3. Solinand. l. 1. cap. 4.

Others attribute this actual heat of Bathes unto the Sun, whoſe beams piercing thorow the pores of the earth, do heat our waters. If this heat which heats our Bathes be cauſed by the beams of the Sun, then either they bring it intirely from the Sun, as a quality proceeding from thence, or they make it by their own motion. If it come from the nature of the Sun, the Sun muſt be extream hot that can heat theſe inferiour parts at ſuch a diſtance; eſpecially the beams which muſt carry it, paſſing thorow the middle region of the air, which is alwayes extream cold, and

The Sun.

and cannot but cool thoſe beams before they come to us. And if they were able to paſs that region without loſing their heat, yet they cannot but warm that region, being nearer to their fountain of heat, as well or better then they can warm our waters, in deſpite of any Antiperiſtaſis. But it is doubtfull whether the Sun be hot of his own nature or no. † The Peripateticks hold it to be hot and dry moderately; yet it muſt be extream hot, if in this manner it do heat our Bathes. And if the Sun be capable of heat, they muſt alſo make it capable of cold (elementary qualities) and then they make celeſtial bodies obnoxious to generation and corruption; which they are not willing to grant. Although in this reſpect they need not fear the decay of the Sun, no more then of the globe of the earth: which though it ſuffer in his parts many alterations, yet the whole remains firm and perpetual, as Mr. Doctor *Hakwell* proves in his learned work upon that argument; and will ſo do untill it be diſſolved by that omnipotent power which framed it. If they make this heat to come from the motion of the Sun, we muſt conſider how the Sun by motion may get ſuch a heat. The Sun is either moved by his own motion, or as he is carried in his Sphear wherein he is fixed. If by his own motion, it muſt be either by volutation upon his *axis*, which is called *κύλισις*, or by circumgyration, which is called *δίνησις*, round about the globe of the earth: and this is the common opinion; which if it be ſo, he muſt be carried more ſwiftly then a bullet out of a peece of Ordnance. I read in the Turkiſh Hiſtory

† It may be ſo in former times, but few, I think, do doubt it now; I am ſure not thoſe who hold the Sun to be a Flame.

His Apology.

ſtory at the ſiege of *Scodra*, of a bullet of twelve hundred weight called the Prince, and it ſeems a great matter. But to have ſuch a bullet as the globe of the Sun, which is held to be 166 times bigger then the globe of the earth, to be carried in a ſwifter courſe, and that perpetually, is a monſtrous, furious, and mad agitation, *inſanus motus*, as one termeth it. The like may be ſaid of the motion of the Sphears: but I will leave the confutation of this to others. But admit it to be ſo; and that this violent agitation is not repugnant to the perpetuity of the Heavens; and that it is able to breed an extream heat in the Sun and celeſtial Spheres, notwithſtanding their tenuity, &c. which is unapt to breed heat by motion or colliſion, for that is proper to ſolid ſubſtances: yet this heat muſt be conveyed to us by the ſame beams of the Sun, and muſt be ſubject to the former impediments.

Gilbertus de magnete lib. 6. Taurellus de primis rerum principiis. Conrad. Aſlacus de triplici cœlo.

Wherefore the beams of the Sun by their motion muſt make this heat, by the collection of many beams together. For if they be diſperſed, no fire will be kindled, but only ſome moderate heat: as we ſee in a burning-glaſs, which will heat a white paper or cloth, but not burn it. Other things it will burn, which are apt fewels; but the whiteneſs of the paper or cloth it ſeems diſperſeth the beams. But no doubt the Sun by his light and beams do warm theſe inferiour parts, eſpecially where they have free paſſage, and reflection withall, and it is to be judged, that the heat not being eſſentially in the Sun, is an effect of the light by whoſe beams it is imparted to us: So that where light is excluded, heat is alſo excluded. And if we can exclude the heat of the beams of the Sun by the interpoſition of a mud wall, or by making a Cellar ſix foot under the ground; how is it likely that theſe beams can pierce ſo deep into the earth; as to heat the water there, as *Lucretius* ſaith,

Lib. 6.]

Qui queat hic ſubter tam craſſo corpore terram
Percoquere humorem, & calido ſociare vapori?
Præſertim cum vix poſſit per ſepta domorum
Inſinuare ſuum radiis ardentibus æſtum.

Under this maſſie bulk of earth how ſhall
The Sun boil water, and there raiſe a ſteam
Whereas we ſee it ſcarce can pierce a wall,
And through't into a Chamber dart a beam.

And if the beams of the Sun be not able to heat a ſtanding Pool in the midſt of Summer, how ſhould they heat a ſubterranean water, which is alwaies in motion, eſpecially in the winter time? Again, if this heat come from the Sun, then in the Summer, when the Sun is hotteſt, the waters ſhould be ſo alſo, and in winter cold, becauſe of the abſence of the Sun; but we find them always alike. Alſo, why ſhould the Sun heat ſome few Fountains and paſs over an infinite number of others, which are left cold? And why ſhould there be hot Fountains in cold Climates, where the Sun hath little power to heat, either by reaſon of his oblique beams, or by reaſon of his long abſence; and yet in hot Climats they ſhould be ſo rare? wherefore it is very improbable, that our Springs are heated by the Sun.

Others

Antiperiſtaſis.

Others have deviſed another cauſe of this actual heat of Bathes, more vain then the former, which they call *Antiperiſtaſis*: where by reciprocation or compreſſion, any quality is intended and exalted to a higher degree. As where heat or cold are compaſſed by their contrary quality, ſo as the vapours or *effluvium* of it is reflected back again, the quality thereof is increaſed. *Hypocrates* gives us an example of it in our own bodies, where he ſaith, *ventres hieme calidiores*; our ſtomachs are hotter in Winter then in Summer, by reaſon the ambient air being then cold, doth ſtop the pores of the skin, and repell thoſe fuliginous vapours which nature would breathe forth, and ſo our inward heat is increaſed: whereas in the Summer, by reaſon of too much eventilation, our natural heat is diminiſhed: and therefore we concoct better in Winter then in Summer. And although it be not ſimple heat which concocts, and makes *chylus* in the Stomach, Blood in the Liver, Seed in the Spermatick Veſſels, or Milk in the Breaſt, &c. as *Joubertus* ſaith: yet heat attending upon the faculties of thoſe parts, doth quicken them, as cold doth benumb them. But if we examine this example aright, we ſhall find a great difference between this and our hot Bathes. For the heat in our bodies is continually fed and maintained from the Heart by his motion: that of Bathes hath no ſuch ſupply according to their doctrine, from any cauſe to make or continue this heat. And therefore the repelling of vapours cannot make water hotter then it is: and being naturally cold, and without any heat; where

In Paradoxis.

where heat is not, how can it be pend in or repelled? Again, in *Hypocrates* his example there is an *interſtitium* (our skin) between the fuliginous vapours and the external air, which keep them from uniting: but in our Bathes there is nothing to hinder the meeting and conjunction of theſe qualities, and then the one muſt dull he other. Moreover, we ſee that any thing hat is naturally cold, as Iron or a Stone, if it be made hot accidentally by fire or otherwiſe, it is ooner cold in cold air, then in a warm place.

So that the *Antiperiſtaſis* doth rather diminiſh hen increaſe the heat of it. Wherefore unleſs vater were naturally hot, or the heat maintained y ſome continual cauſe, this *Antiperiſtaſis* can lo no good, but by his oppoſite quality would ather cool it. Nay heat it ſelf cannot make any hing more hot, unleſs it be greater then the heat f the thing it ſelf. But to aſcribe the generaion of heat to cold, and ſo to make it the cauſe of is contrary, is againſt the law of Nature. No uality of it ſelf is increaſed by his contrary. It true, that a pot of water ſet over the fire, will e ſooner hot, being covered, or otherwiſe the apours kept in, then being open: but there uſt be fire then to heat it, and to continue the eat: otherwiſe the *Antiperiſtaſis* will do noing; unleſs it make it more cold, and congeal into Ice, if the air ambient be more cold then e water. Some may object, that they find ſome ountains warmer in Winter then in Summer, d to reak when they break forth into the air; as ave ſeen at *Werckſworth* and *Bakewell* in *Darſhire*: and therefore this doth argue an *Antiperiſtaſis*.

3 Simpl.medic. facult. cap. 7.

periſtaſis. *Galen* thinks that theſe waters do but ſeem ſo to our ſenſe: our hands being hot in Summer, and cold in Winter, as our Urins ſeem cold in a hot Bath. But I will grant with *Valeſius* that many deep Fountains may be ſo indeed, and not in appearance only, as partaking with ſome warm exhalations, eſpecially in Mineral Countreys, as *Darbyſhire* is.

Moreover, if our Bathes were heated by an *Antiperiſtaſis*, then they ſhould be hotter in Winter then in Summer; but we find them alwayes alike. Alſo if a cold ambient be able to make cold water hot, why ſhould not a hot ambient make it more cold? eſpecially ſeeing the vapours are cold, which being repelled by heat, which doth terminate cold, ſhould increaſe the coldneſs of the water. Alſo if we ſhould grant this *Antiperiſtaſis*, we muſt deny the reactio and reſiſtance between the qualities of the Elements: and ſo overthrow all temperament which ariſe from thence: and alſo our compoſition of medicines were in vain. Wherefor this *Antiperiſtaſis* is an idle invention to maintain this purpoſe.

Valeſius contro. lib.1. cap. 5. Magyrus lib.3. cap. 3.

Quick Lyme. Others attribute this actual heat to quic Lyme, which doth readily heat any water ca upon it, and alſo kindle any combuſtible ſubſtance put into it; this is *Democritus* his opinion. To this I anſwer, that Lyme is an artificial thing, not natural, and is never found in th bowels of the earth. Beſides, if it were found one fuſion of water extinguiſheth the heat of i and then it lyeth like a dead earth, and will yiel nor more heat, So as this cannot procure a perpe

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tual heat to Bathes : neither can the Lymeſtones without calcination, yield any heat to water , nor will break and crackle upon the affuſion of water , as Lyme doth. Wherefore this opinion is altogether improbable.

Subterranean *Fire.*

Others attribute this actual heat to a ſubterranean fire kindled in the bowels of the earth. Let us conſider how this may be. Fire is a quality and the higheſt degree of heat , which cannot ſubſiſt without a ſubject ; for I define it to be *intenſiſſimus calor in corpore cremabili :* The higheſt degree of heat in a combuſtible body : And it is received into his ſubject either by propagation or coition , as when one candle lights another , or by motion , as colliſion, concuſſion, dilatation, compriſſion, putrefaction, fermentation , reflection, &c. yet all motion doth not kindle fire although it heat ; neither are all ſubſtances apt to be heated by motion. Air and water are rather colder by motion : but this rule holds in ſuch things as are apt to receive heat by motion, as ſolid ſubſtances, combuſtible ſubſtances, &c. And the heat of animals, vegetables, and minerals , which they have for their generation and nutrition, is from motion : although this heat is not in ſo high a degree as fire is, for then it would conſume them ; but as the motion is moderate, and agreeable to each nature, ſo is the heat. This motion in natural things proceeds from their ſeeds or forms , and may be called internal or natural. External motions are violent agitations , concuſſions, &c. which commonly kindle fire in apt matter. As for the element of fire, which ſhould be pure, not ſhining,

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and therefore inviſible, and ſubſiſting without a ſubject or fewel: let them find it who know where to ſeek for it. For my part I know no element of fire, unleſs we ſhould make it to be that which is natural to all creatures and their ſeeds, cauſing their fermenting heat, whereof I ſhall ſpeak anon. And this interpretation we may well make of *Hypocrates*, where he ſaith, that all things are made of fire and water; and that theſe two are ſufficient for all generations; fire giving motion, and water nutrition. And it is not likely that this fire ſhould be fetched from a remote place, and downwards, againſt the nature of fire, for every generation: but that it be near hand, and inbred in the ſeeds themſelves, as the principal ingredient into every natural thing; whereas if it were remote, what ſhould bring it continually, and unite it with the other elements in theſe generations? Wherefore this is moſt likely to be the element of fire. Our burning fire is all of one nature, not differing in kind, but only in degree according to th quality of the fewel. Some fewels will make a manifeſt flame, as all thin and light ſubſtances Sulphur, liquid Bitumen, Oyle, Fat, &c. Som only a glowing coal, with little or no flame, a ſome ſorts of Stone-coal. Yet all fire doth ſen forth fuliginous vapours, which would choak i if there were not vent for them into the air: a we ſee in the making of Char-coal, althoug they cover their fire with lome, yet they mu leave ſome vent for the ſmoke; though not ſ much as may make it to flame, yet enough t maintain the fire. Of the firſt flaming ſort the

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are divers degrees, as that of Straw, Brimſtone, Spirit of Wine, Naphtha, Petroleum, &c. Some of which will ſcarcely take hold upon other fewel: as one may wet a linnen cloath in Spirit of Wine, and being kindled, he ſhall hardly find the cloath ſcorched. The like hath been obſerved in that exhalation which is called *ignis fatuus*, being of a very thin ſubſtance, from Bitumen or Naphtha. Some reckon Comets among theſe fiery exhalations: but I can hardly believe that they are any kindled ſubſtances. Firſt, becauſe their flame is not pyramidal, as it is in all kindled ſubſtances. Secondly, becauſe if they be of a thin ſubſtance from Sulphur and Bitumen, the flame would be greater, ſeeing it muſt be plentiful, if it continue ſo long in burning, as we find them to do. Or admit that this matter be kindled by ſucceſſion, yet it is incredible that it ſhould continue burning above a year together; as that Comet *Xiphian*, which laſted a whole year: Another, *Anno* 1572. under the conſtellation of *Caſsiopæa*, laſted a year and a half, others ſix months, others three, &c. If the Sulphurous or Bituminous matter be thick, it will melt in burning, and rain down Brimſtone and Bitumen upon us. Thirdly, if Comets were kindled ſubſtances, what entertainment could they find above the Moon, and among the ſpheres, where they ſay no corruptible or elementary ſubſtance can be indured. But many of our Comets have been obſerved to have been above the Moon, and ſome among the fixed Starrs, as hath been obſerved by *Tycho Brahe*, and *Clavius*: and upon due obſervation

Comets, probably not kindled ſubſtances.

they could find ſome of them to admit no Paralaxis, or diverſity of aſpect to any ſtar in different Climats.

This argumnnt may be good againſt a Peripatetick; but a Platoniſt, or a Pythagorean, who hold the Heavens to be made of elementary matter, and ſubject to generation and corruption, will not allow it, no more will many of our Divines.

For glowing fires, we have none but they muſt be kindled, and then they muſt have vent for their fuliginous vapours, and they muſt be kindled either by propagation or coition from ſome other fire, or by violent motion able to kindle them, which we ſhall hardly find in the bowels of the earth, where all is quiet, and no ſpace for any ſuch perturbation.

But they ſay there is an *ignis ſubterraneus*, which being kindled upon Sulphur and Bitumen, diſperſeth it ſelf among other Mines of the like nature, and ſets them on fire. Now we are come from Heaven to Hell, or to Purgatory at the leaſt, which *Pythagoras* calls *materiam vatum falſique pericula mundi*; The dream of Poets, and a forged fear. The largeſt deſcription of it is in *Virgil*: from whence both Divines and Philoſophers derive much matter: and *Baccius* doth believe that there is ſuch a thing in the Center of the Earth. But if we obſerve *Virgil* well, we ſhall find that he propounds it but as a dream: for in the end of that Book he ſaith,

Metamorph. 15.

Sunt geminæ ſomni portæ; quarum altera fertur
Cornea, qua veris facilis datur exitus umbris:
Altera candenti perfecta nitens Elephanto,
Sed falſa ad Cœlum mittunt inſomnia manes.

Ænead. 6.

Dreams have two gates, the one is ſaid to be
Of Horn, through which all true conceits do flee;
The other framed all of Ivory rare,
But lets out none but ſuch as forged are.

Now ſaith he, when *Anchyſes* had led *Æneas* and *Sibilla* through Hell, he lets them forth at the Ivory gate (*Portaque emittit Eburna*:) As if he ſhould ſay; all that I have related of Hell, is but a fiction; and thus *Ludovicus Vives* interprets it in his Comment upon this place.

I hope none will think that I deny a Hell, but I approve not of the aſſignment of it to the center of the earth, or that that fire ſhould ſerve as *Baccius* would have it, to further all generations in the earth: and as others, to be the cauſe of Fountains, Winds, Earth-quakes, Vulcanoes, Storms, Saltneſs of the Sea, &c. nor of the actual heat of our Bathes, although it be the moſt common received opinion.

Firſt for the place, it is not likely that the center of the earth, whither all heavy things do tend, ſhould be hollow, but rather more compact then any other part of the earth, as likewiſe *Valeſius* thinks; but if there be any concavities, they are between the Center and the Superficies; and theſe concavities being receptacles of water from the Sea, cannot alſo receive fire.

Agricola. Baccius l. 1. cap. 19.

Theſe two will not agree together in one place, but the one will expel the other: for whereas ſome hold that Bitumen will burn in water, and is nouriſhed by it, it is abſolutely falſe, as experience ſhews; and I have touched it among the *Bitumina.*

Moreover, if the heat which warms our Bathes did proceed from hence, there muſt be huge veſſels above the fire to contain water, whereby the fire might heat it, and not be quenched by it. Alſo the vapours ariſing from hence, muſt be hotter then water can endure, or be capable of; for as they aſcend towards the ſuperficies of the earth, they muſt needs be cooled as they paſs by Rocks, or elſe they could not be congealed into water again: and after this congelation, the water hath loſt moſt of his heat, as we find in our ordinary diſtillations of Roſe-water, &c. where we ſee our water to deſcend into the receiver, almoſt cold; ſo that they cannot derive our hot Bathes from hence.

Secondly, for the fire it ſelf, although wate and air may be received into the bowels of the earth, yet there is great difficulty for fire. Fo the other two need no nouriſhment to ſuppor them, as fire doth. If there be not competenc of air to nouriſh the fire by venting his fuliginou vapours, howſoever there be fewel enough, it i ſuddenly quenched, and ſuch huge and flamin fire as this muſt be, will require more air the can there be yielded: a great part thereof paſ ſing away through the ſecret creeks of Rocks and little or none entring through the Sea. An therefore daily experience ſhews, that our mi

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neral men are fain to ſink new Shafts (as they call them) to admit air to their works, otherwiſe their lights would go out. Although one would think, that where many men may have room enough to work, there would be ſpace enough for air to maintain a few lights. The like we ſee in Cupping-glaſſes, where the light goes out as ſoon as they are applied. Alſo there are no fires perpetual, as hot Bathes are, but are either extinct, or keep not the ſame tenor. Wherefore fire cannot be the cauſe of this conſtant heat of Bathes. It muſt be a continual cauſe that can make a continual heat. Alſo where fire is, there will be ſmoak, for as it breeds exhalations, ſo it ſends them forth. But in moſt of our hot Bathes we find none of theſe dry exhalations. Moreover, fire is more hardly pend in then air; yet we ſee that air doth break forth: wherefore fire ſhould alſo make his way, having fuel enough to maintain it. So they ſay it doth in our Vulcanoes at *Hecla* in *Iſeland*, *Ætna* in *Sicicy*, *Veſuvio* in *Campania*, in *Enaria*, *Æolia*, *Lipara*, &c. But it is yet unproved that theſe eruptions of fire do proceed from any deep cauſe, but only are kindled upon or neer the ſuperficies of the earth, where there is air enough to feed it, and means enough to kindle it by lightnings, or other caſual means. Whereas in the bowels of the earth, there is neither air to nouriſh it, nor any means to kindle it; ſeeing neither the beams of the Sun, nor Wind, or other Exhalations, nor any Antiperiſtaſis, nor Lyme, nor Lightnings can do it. For the ſame reaſons that exclude the Beams of the Sun and exhalations, will likewiſe exclude lightnings.

Thirdly, for the fuel, there are only two ſubſtances in the bowels of the earth, which are apt fuels for fire, Bitumen and Sulphur.

Donatus de aquis Lucenſibus lib. 1. cap. 18.

Sulphur is in ſuch requeſt with all men, as they think there can be no hot Bath without it: nay many hold, that if water do but paſs thorow a Mine of Brimſtone, although it be not kindled, but actually cold, yet it will contract from thence, not only a potential, but an actual heat. But we do manifeſtly find, that neither all hot waters are ſulphurous, nor all ſulphurous waters hot (as is ſaid before in Sulphur.)

Geſner. Epiſt. lib. 3. pag. 90.

The Bathes of *Caldanella* and *Avinian in agro Senenſi*, *de Grotta in Viterbio*, *de aquis in Piſano*, *Divi Johannis in agro Lucenſi*, *Balneum Geberſwilleri in Halſatia*, *&c.* are all hot, and yet give no ſigne of Sulphur, either by ſmell, or taſte, or quality, or effect. Contrariwiſe that all ſulphurous waters are not hot, may appear by the Bathes in *Zurich* in *Helvetia*, of *Buda* in *Pannonia*, at *Cure* in *Rhetia*, *Celenſes* in *Germany*. In *Campania* between *Naples* and *Puteolum*, are many cold ſulphurous Springs. At *Brandula in agro Carpenſi*, *&c.* All which Bathes ſhew much Sulphur to be in them, and yet are cold. And no marvel, for if we infuſe any ſimple, be it never ſo hot potentially, yet it will not make the liquor actually hot. Wherefore this Sulphur muſt burn before it can give any actual heat to our Bathes; and then it muſt needs be ſubject to the former difficulties, and alſo muſt be continually repaired by new generations of matter, which actual fire cannot further, but rather hinder.

der. The fire generates nothing, but conſumes all things. *Lib.1. cap. ult.*

The like we may judge of Bitumen, that unleſs it be kindled, it can yield no heat to our Bathes; as *Solinander* reports of a Bituminous Mine in *Weſtfalia, in agro Tremonenſi,* where going down into the Grove, he found much water, having the ſmell, taſte, and colour of Bitumen, and yet cold. *Agricola* imputes the chief cauſe of the heating of Bathes, unto the fuel of Bitumen; *Baccius* on the other ſide to Sulphur. But in my opinion, they need not contend about it. For, as I have ſhewed before in the examples of mineral waters, there are many hot Springs from other minerals, where neither Sulphur nor Bitumen have been obſerved to be. *John de Dondis*, and *Julius Alexandrinus* were much unſatisfied in theſe opinions, and did rather acknowledge their ignorance, then that they would ſubſcribe unto them. I need not diſpute whether this fire be *in Alveis*, or *in Canalibus*, or *in vicinis partibus, &c.* becauſe I think it is in neither of them.

CHAP. XIV.

The Authors opinion concerning the cauſe of actual heat, and medicinal virtue in Mineral Waters.

WHerefore finding all the former opinions to be doubtfull and weakly grounded concerning the cauſes of the actual heat of Bathes; let me preſume to propound another, which I perſwade my ſelf to be more true and certain. But becauſe it hath not been mentioned by any Author that I know, I have no mans ſteps to follow in it.

Avia Doctorum peragro loca, nullius ante
Trita ſolo.

I travel where no path is to be ſeen
Of any learned foot that here hath been.

Which makes me fearfull in the delivery of it. But if I do err in it, I hope I ſhall not be blamed; ſeeing I do it in diſquiſition of the truth.

I have in the former Chapters ſet down mine opinion concerning the generation of minerals, that they have their ſeminaries in the earth repleniſhed with ſpirits, and faculties attending them; which meeting with convenient matter and adiuvant cauſes, do proceed to the generation of ſeveral ſpecies, according to the nature of the efficient, and aptnes of the matter. In this work of generation, as there is *generatio unius*, ſo there muſt be *corruptio alterius.* And this cannot be done without a ſuperiour power, which by moiſture, dilating it ſelf, worketh upon the matter, like a ferment to bring it to his own purpoſe. This motion between the agent ſpirit, and the patient matter, proceedeth from an actual heat (*ex motu fit calor*) which ſerves as an inſtrument to further this work. * And this motion being natural and not violent produceth a natural heat which furthers generations; not a deſtructive heat. For as cold dulls and benumbs all faculties, ſo heat doth quicken them. This I ſhewed in the example of Malt. It is likewiſe true in every particular grain of Corn ſown in the ground, although by reaſon they lie ſingle, their actual heat is not diſcernable by touch; yet we find that external heat and moiſture do further their ſpiring, as adiuvant cauſes; where the chief agent is the generative ſpirit in the ſeed. So I take it to be in minerals, with thoſe diſtinctions before mentioned. And in this all generations agree, that an actual heat, together with moiſture, is requiſite: otherwiſe there can neither be the corruption of the one, nor the generation of the other. This actual heat is leſs ſenſible in ſmall ſeeds and tender bodies, then it is in the great and plentifull generations, and in hard and compact matter: for hard bodies are not ſo eaſily reduced to a new form, as tender bodies are; but require both more ſpirit and longer time to be wrought upon. And therefore whereas vegetable generations are brought to perfection in a few months, theſe

* What Dr. *French* hath ſaid againſt this opinion, may be ſeen it the 19, 20, & 21. pages of his *Yorkſhire* Spaw.

mineral generations do require many years, as hath been obſerved by Mineral men. Moreover, theſe generations are not terminated with one production, but as the ſeed gathereth ſtrength by enlarging it ſelf, ſo it continually proceeds to ſubdue more matter under his government: ſo as, where once any generation is begun, it continues many ages, and ſeldome gives over. As we ſee in the Iron Mines of *Illua*, the Tin Mines in *Cornwall*, the Lead Mines at *Mendip*, and the *Peak*, &c. which do not only ſtretch further in extent of ground, than hath been obſerved heretofore; but alſo are renewed in the ſame groves which have been formerly wrought, as our Tinners in *Cornwall* do acknowledge; and the examples of *Illua* and *Saga* before mentioned, do confirm. This is a ſufficient means for the perpetuity of our hot Springs; that if the actual heat proceed from hence, there need be no doubt of the continuance of them, nor of their equal tenor or degree of heat.

Now for the nature of this heat, it is not a deſtructive heat, as that of fire is, but a generative heat joyned with moyſture. It needs no air for eventilation, as the other doth. It is in degree hot enough for the hotteſt Baths that are, if it be not too remote from the place where the water iſſueth forth. It is a means to impart the qualities of minerals to our waters, as well as heat, by reaſon the minerals are then *in ſolutis principiis*, in their liquid forms, and not conſolidated into hard bodies. For when they are conſolidated, there are few of them that will yield any quality to water, unleſs they be the concrete juyces, or any actual heat, becauſe that is procured by the contiguity of bodies, when one part lyeth upon another, and not when they are grown *in corpus continuum*; as we ſee in Malt, where by turning and changing the contiguity, the heat is increaſed, but by ſuffering it to unite, is quenched: But before conſolidation, any of them may yield either ſpirit or juyce, or tincture to the waters, which by reaſon of their tenuity (as is ſaid before) are apt to imbibe them. Now if actual fire kindled in the earth, ſhould meet with theſe minerals whilſt they are in generation, it would diſſipate the ſpirits, and deſtroy the minerals. If it meet with them after conſolidation, it will never be able to attenuate them ſo, as to make them yield their qualities to water. For we never find any metals or minerals melted in the earth, which muſt be, if the heat of actual fire were ſuch as is imagined: neither do we ever find any flores of metal ſublimed in the earth. This natural heat is daily found by our Mineral men in the Mines, ſo as oftentimes they are not able to touch them, as *Agricola* teſtifieth; although by opening their groves and admiſſion of air, it ſhould be well qualified. Whereas on the other ſide, it was never obſerved, that any actual kindled fire was ever ſeen by workmen in the earth, which were likely to be, if theſe fires were ſo frequent.

Thurneiſer Alchimia magna lib. 4, c. 8.

Wherefore ſeeing we ſee that Mineral waters do participate with all ſorts of Minerals, as well metals as other, as hath been ſhewed in the particular examples of all of them: ſeeing alſo that few of them, unleſs Mineral juyces, are able to impart their quality to water, as they are conſolidated, but only as they are *in ſolutis principiis*, and whilſt they are in generation, as is agreed upon by all Authors: ſeeing alſo this natural heat of fermentation muſt neceſſarily be preſent for the perfecting of their generation, and is ſufficient, in regard of the degree of heat to make our Baths as hot as they are: ſeeing alſo that the other adventitious fire would rather deſtroy theſe Minerals, than further them: ſeeing alſo we cannot imagine it either likely, or poſſible, without manifold difficulties and abſurdities: I do conclude that both the actual heat of Baths, and the Mineral qualities which they have, are derived unto them by means of this fermenting heat: * Which is ſtill *in fieri*, not *in facto eſſe*, as the Schoolmen term it: and therefore makes the heat continual.

Martin. de prima generatione.

Examples might be brought from all kind of generations, and from ſome artificial works, of this fermenting heat proceeding from the ſeeds of natural things. Theſe ſeeds containing the ſpecies and kinds of natural bodies, are not from the Elements, but are placed in the Elements, where they propagate their ſpecies and individuals, according to their nature, and have their due times and ſeaſons of appearing upon the Stage of the World. Animals have their ſet times when their ſpermatick ſpirits are in turgeſcence, ſome once, ſome twice a year, and ſome oftner: eſpecially in the Spring; *Vere magis, quia Vere calor redit oſſibus*; as *Virgil* ſpeaks of Mares: only man in regard of his excellency above other creatures, is not ſo confinde.

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* The cauſe of the heat in Bath, aſſigned by Dr. *Rouzee*, is their motion and agitation in the bowels of the Earth, falling from Cataracts and broken Concavities in the ſame. But afterwards, lighting on this opinion of Dr. *Jordens*, he is ſo far from diſliking, that he applauds it, and deſervedly calls this work learned and elaborate. *Vid. Lud. Rouz. Tr.* of *Tunbr.* water, p. 20, 21. & 22. in margine.

Vegetables have likewiſe their ſeaſons of ſetting and planting, as they may have the earth and the ſeaſon moſt convenient: yet at any time, if their ſeeds get moyſture and heat to dilate them, they will ferment and attempt the production of more individuals: but oftentimes the Artiſt doth abuſe this intention of nature, and converts it to his ends: and oftentimes nature being ſet in action to proceed *a potentia in actum*, doth want convenient means to maintain her work: as when we ſee a Rick of Hay or Corn which hath received moyſture, burnt to aſhes. So in the making of Malt, or Woad, or Bread, or Beer, or Wine, &c. we make uſe of this generative ſpirit for our ends: that we may ſtir up, and quicken it. Otherwiſe our Bread would not be ſo ſavoury, our Beer would be but Wort, our Wine would be but Muſt or Plum-pottage, and want thoſe ſpirits which we deſire; and which lie dead and benummed in the ſeeds, untill they come to fermentation. And in all theſe there is an actual heat, although it appear not in liquid things, ſo well as in dry: becauſe it is there quenched by the abundance of moyſture; yet we may obſerve active ſpirits in it, by the bubling and hiſſing, and working of it. This is evident in artificial Wines, which may be made of Figs, Dates, dryed Rayſins, Currants, Slows, Strawberries, Brambleberries, and ſuch like, when they are infuſed in water. They will ferment of their own accord, by virtue of the ſeeds which are in them, and make as good and as natural Wine as the juice of the green fruit, as I have often proved. The Turks have a drink which they call Couſet or Poſſet, which is made of Barly after ſuch a manner, as *Bellonius* reports in his obſervations. *Lib.2. cap. 98.* It ſeems alſo that the Scythians drink was made in this manner, which *Virgil* ſpeaks of.

Hic noctem ludo ducunt, & pocula læti
Fermento atque acidis imitantur vitea ſorbis. *Georg. 3.*

They dance and quaff, by the Moon-ſhine,
Fermented juice of Slows, like Wine.

And I perſwade my ſelf that we have not yet attained to a perfect artifice of our Beer and Ale, which ſtands upon the ſame grounds, and may be wrought in ſuch a manner, if they would take the pains to try ſome concluſions upon it. It might ſave much fuel, and veſſel, and labour, and perhaps with advantage in the product. For I ſee but two points to be obſerved in the working of it: the one is to extract the ſubſtance of the Malt into water: the other to give it his due fermentation. And both of theſe may be done without boyling. But the artifice will differ ſomewhat from Wine, and will require many concluſions to be tryed upon it, before it be brought to perfection. I do mention theſe artifices only to ſhew the power of this ſeminary and fermenting ſpirit, and how it may be drawn to other uſes for our benefit. As this is found in vegetables, ſo likewiſe in Minerals; which as they have this generative ſpirit for the propagation of their ſpecies, as hath been ſhewed before, ſo they have this means of fermentation, to bring them from a potential quality, to an actual exiſtence. And as their matter is more plentifull, and in conſiſtence more hard and compact; ſo theſe ſpirits muſt be more vigorous and powerfull to ſubdue it: and conſequently the heat of their fermentation muſt be in a higher degree, then it is in other generations.

A brief collection of the the Authors arguments againſt the opinions of others touching the actual heat of Bathes,

Now having ſhewed the erroneous opinions of others concerning this actual heat of Bathes, and explain'd our own conceit of the true cauſe of it; let us collect our arguments together, the principal whereof are here and there diſperſed in this Treatiſe,

Quem nos ſtramineum pro tempore fecimus,

Which for the preſent I have made of Straw.

Hoping that hereafter ſome worthy pen may handle this argument more accurately, and give it a better flouriſh,

Et dare perpetuo cæleſtia fila metallo:

And on firm metal laſting threads beſtow.

We muſt not imagine that the government and ordering of the world and nature in a conſtant courſe, is performed by miracle, but that natural effects have natural cauſes, and muſt be both under the ſame *genus*. Wherefore following the ordinary diſtribution, ſeeing it comprehends all, and not queſtioning the celeſtial bodies, whether they be elementary or no, that is, ſubject to alterations, as intention and remiſſion, generation and corruption, &c. We ſay that this heat muſt proceed either from the ſuperiour and celeſtial bodies, as the Spheres and Starrs, or from the inferiour or ſublunary.

From the ſuperiour Spheres or Globes it cannot proceed, ſeeing (as is ſhewed before) they are neither indowed with ſuch a degree of native heat, nor can acquire it accidentally by their motion, being thin and liquid bodies; neither, if they had it, can they convey it unto the earth, but by their beams, which are not able to retain it as they paſs thorow the cold region of the air, nor able to warm that, although it be nearer to their fountain of heat. Wherefore if theſe beams can any way do it, it muſt be by their motion and reflection upon the earth: and this is no conſtant heat, but varieth according as the beams are perpendicular or oblique, and according as the air is cleer or cloudy, &c. And as they are not able to give this conſtant heat, ſo the earth in her bowels is not capable to receive it, being hindered by the denſity of the earth and rocks, and the heat of reflection taken away before it can come three foot deep.

From the inferiour parts of the world if it proceed, it muſt be either from the Elements, or from mixt bodies. From the Elements it cannot come, but from fire; for all the other Elements are cold, as I have ſhewed, eſpecially the earth where this heat is ingendred.

And as for the Element of Fire, ſeeing we know not where to find it, neither, if it be any where, doth it perform the office of an Element in production and nutrition of creatures; as *Ariſtotle* ſaith, *Ignis nil generat*, and therefore *nil nutrit; nam nutritio fit ex iiſdem ex quibus conſtat*: therefore as it begets nothing, ſo it nouriſheth nothing; and ſo cannot be an Element, nor as an Element maintain this heat of Bathes. But contrariwiſe if it have no power of begetting or nouriſhing any thing, it muſt have a power of deſtroying or hindering nature in her proceedings; for nature will admit of no *vacuum* or idle thing. Alſo ſeeing Nature uſeth no violent means to maintain her ſelf, this elementary fire cannot be pen'd in the center of the earth, being of a thin ſubtilnature,and naturally aſpiring upwards: and if it have any place aſſigned unto it, it muſt be above the other Elements, and then it cannot be drawn downwards againſt his nature, and that continually, without breach of the order and courſe of nature. And whereas they place the Element of Fire under the concave of the Moon, being in it ſelf lucid and reſplendent, it is ſtrange that it is not ſeen by us, neither makes our nights light. For although by reaſon of his tranſparency it doth not terminate our ſight, yet it ſhould remove the obſcurity of our nights much better then the *Via lactea*. Moreover, if it were there, we muſt ſee the Starrs through a double *Diaphanum*, one of air, and another of fire,and ſo would make a double refraction: which is elegantly confuted by *John Pena* and *Conradus Aſlacus*.

3. De gen. animal.

2. De gen. animal. cap. 3.

In præfat. in Opticum Euclidis. De triplici cælo lib.1. c.4.

But there is another thing ſubſtituted in the place of this element of fire, and maintained by air, and by mineral ſubſtances in the earth; which is neither an Element, nor a mixt body, nor any ſubſtance at all, but a meer quality: and this is preferred by moſt to be the cauſe of the heat of our Bathes. And this is our common kitchin-fire, which is kindled by violent motion, maintained by fewel, without which it cannot ſubſiſt, and extinguiſhed by his contrary. And although it may be derived by communication or coition, as one candle lights another, yet originally it is kindled by violent motion, and what violent motion can there be in the bowels of the earth to ſtrike fire, or who ſhall be the fueller? Exhalations and lightnings cannot do it, being aereal meteors, and no more penetrable then the beams of the Sun. And therefore although they may kindle a Vulcano upon the ſurface of the earth, yet they cannot pierce deep, and their very reflection upon the ſuperficies of the earth takes away their ſtrength: ſo as they can neither kindle new fire, nor commucate that which is kindled to any other fuel. For if it be by communication or coition, that muſt be by touch, *per contactum*, and then in the earth it can make but one fire, and not many, being not diſtinct in place, and muſt increaſe in heat: and then it will not keep a conſtant tenor, as our Bathes do.

Secondly for the nouriſhment of it, being quality, it muſt have a ſubject, that is fuel, and it muſt have means to vent the fuliginous vapour which it breeds in the diſſolation of the fuel, le

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they recoyle and quench the fire; as alſo there muſt be conveyance for the aſhes which will fall down continually upon the fire, and quench it. Moreover, by conſuming ſuch great quantities of Sulphur and Bitumen, and by mollifying and breaking of Rocks, it would cauſe a great ſinking of the earth in thoſe places; as we ſee in our Vulcanoes, where whole mountains have been conſumed and brought to even ground.

Thirdly, this fire being a quality, is ſubject to intention and remiſſion, and to utter extinguiſhment, not only by want of fuel, which cannot be regenerated where this actual fire is, nor for want of vent, or choaking of aſhes, &c. but alſo by reaſon of the abundance of water which the earth receiveth for the generations of Minerals, which being oppoſite to fire, would quench it. Wherefore we cannot rely upon any ſubterranean fire for the maintenance of our hot Bathes.

From the air this heat of Bathes cannot proceed, ſeeing it is neither hot in it ſelf, as hath been proved, nor can get any heat by motion, being of a thin liquid ſubſtance, which no attrition or colliſion can make hot. And as for aereal meteors, bred from exhalations, and kindled, as is imagined, by an Antiperiſtaſis: if they be bred in the air, they are not able to penetrate into the bowels of the earth, as hath been ſaid before: if in the earth, beſides the difficulty of finding room enough for ſuch plentiful exhalations as thoſe muſt be which procure lightning and thunder, and the vanity of their Antiperiſtaſis to kindle theſe exhalations, as hath been ſhewed before; it is a ſufficient refutation to take away the ſubject of the queſtion, that is, all ſubterranean fire, as I hope I have done; and then we need not diſpute about the means of kindling it, &c. theſe momentary meteors being produced only to kindle, and not to maintain this fire.

From the water no man will derive this fire, being a cold and moiſt Element, and apt to quench it; unleſs it be by dilating the ſeminary ſpirits of natural ſpecies; and then they concur with us, and renouncing the actual fire, do confirm our heat of fermentation.

From the earth ſome have imagined an inbred heat, *ingenitum terræ calorem*, whereby it ſeems they had ſome glimmering of this light which we have given, but have left it in as great obſcurity as the Antiperiſtaſis or Antipathy; and earth being a cold and dry Element, cannot be the cauſe of this heat, as it is earth.

So as it is manifeſt that naturally the Elements cannot procure this heat of Bathes; and by violent motion they can do as little. For the earth being immovable, cannot be ſtirred by any violent motion; and the other three Elements, as Fire, Air, and Water, being thin and liquid ſubſtances, can procure no heat by any motion or colliſion either upon themſelves, or upon the earth; eſpecially in the bowels of the earth, where all is quiet, and no room or ſcope for any ſuch motion as this muſt be. So that neither the other three Elements, nor the earth, either in the whole, or in the parts, can be the cauſe hereof by any violent motion.

From mixt bodies if this heat come, it muſt be from animals, vegetables, or minerals. Animals are not ſo plentiful in the earth as to cauſe this heat of Bathes, either alive or dead. We read of ſubterranean animals which have both motion, and ſenſe, and underſtanding, in *Vincentius in ſpeculo naturali*; in *Lactantius*; in *Agricola, de animantibus ſubterraneis*; in *Bellonius, Ortelius, Paracelſus, &c.* who calls them *Gnomi*, the *Germanes Bergmaenlin*, the *French Ravat*, the *Corniſh-men Fairies*. The *Danes* are generally perſwaded that there are ſuch creatures. But if any ſuch living creatures be able to procure this heat, it cannot be by their hot complexions, but it muſt be by violence and ſtriking of fire. Perhaps *Democritus* hath hired them to make his lyme there, or ſome other to erect forges for thunder, lightning, and ſuch like fireworks.

Bronteſq; Steropeſq; & nudus membra Pyracmon.

But theſe opinions deſerve no confutation.

From dead animals in their putrefaction ſome heat may appear, but ſuch as neither for the degree, nor for the continuance, can be anſwerable to our Bathes.

For vegetables there is the ſame reaſon as for dead animals; neither doth the earth breed ſuch plenty of theſe in her bowels, as to procure a months heat to a tun of water, in one place.

Wherefore we have nothing to ground upon but mineral ſubſtances, whereof the earth affords enough.

For there is no part of the earth but is repleniſhed with mineral ſeeds. And although ſome may think that becauſe minerals are not found, or not wrought in all places: and that ſome waters are alſo found which do not participate of the virtues of minerals, that therefore our hot Bathes proceed not from the fermentation of minerals, but from ſome other cauſe; they are miſtaken. For although metals ate not frequent in ſome places, or at the leaſt not diſcovered; yet a man ſhall hardly dig ten foot deep in any place, but he ſhall find rocks of ſtone, which have their generation as well as other minerals, or ſome of the Salts, or *Bitumina*, or Spirits, or mean metals, &c. And how can Bathes receive mineral qualities, but from minerals? Therefore where Bathes are, there muſt be Minerals, although where Minerals are, there are not always Bathes. But perhaps they are not ſo accumulated, as by their contiguity they are able to yield any manifeſt heat; their matter being diſperſed as grains of corn ſown in a field, which by reaſon of their lying ſingle, do not ſhew a ſenſible heat in their fermentation; or moſt metals breeding between a Hanger and a Lieger, which *Agricola* calls *pendens* and *jacens*, are ſeldome above a foot thick, and therefore cannot yield much heat to our waters. And this is the cauſe why we have ſo few Bathes from Gold, Silver, Tin, Lead, &c. But where much matter is accumulated together, the very contiguity (one part lying upon another) will make a manifeſt heat, untill it grow to a *corpus continuum*, when the generation is perfected, and then the heat is extinguiſhed. Or perhaps they have not water ſo plentifull as may yield a living ſpring, although they may have ſufficient for the uſe of their generation. Or perhaps where they break forth, they meet with deſart ſands, as in *Arabia, China, Africa, &c.* which drink up the water, and hinder the eruption of it. And whereas there are ſome hot ſprings found which do not ſhew any mineral quality in them, the reaſon of this may be the want of concrete juice, which, as I have ſaid before, is the *medium* of communicating mineral qualities and ſubſtances with water. For without them, water is as unapt to imbibe minerals, as it is to unite with oyle. So as water may of it ſelf receive actual heat from the fermentation of minerals, but not their qualities, without the mediation of ſome of the concrete juices: as contrariwiſe we find ſome Fountains that receive mineral qualities, and yet are cold: whereof I have given many examples. The reaſon whereof is either for that they have paſſed a long way, and by many Meanders from the place of generation to the place of their eruption, and ſo have loſt their heat; or elſe the concrete juices, which will diſſolve in water without any heat, being impregnated with other minerals, do impart them to water, and yet without heat. But to ſay that there is any earth without mineral ſeeds, is to make a *vacuum in rerum natura*, and to deſtroy the uſe of the Elements. It is true that the ſeeds do do not alwaies meet with opportunity to diſplay themſelves, and ſometimes they are fain to ſerve under other colours, which are more predominant: but there is no part of the earth without ſome ſeeds or other.

And from hence we muſt derive the original of the actual heat of Bathes: for nothing elſe in the world will ſerve our turn to procure ſo laſting and ſo uniform a heat unto them; and that not by kindling any actual fire about them, for moſt of our minerals whereof our Bathes conſiſt, and from whence they receive both their actual heat and virtues, will not burn, neither have any actual heat in themſelves, being all cold to the touch, but receive it by a fermenting heat which they have in their generation: without which there is no generation for any thing. And this heat continues ſo long as the work of generation continues: which being once begun, doth not ceaſe in many ages, by reaſon of the plenty of matter which the earth yields, and the firmneſs and ſolidity thereof. And although after that the minerals have attained to their perfection, this heat ceaſeth, yet the generation extends further then where it firſt began, and enlargeth it ſelf every way, the works of nature being circular: ſo as the water which was heated by the firſt generation, cannot avoid the other ſucceeding generations, but muſt meet with them either behind or before, beneath or above, on the one ſide, or on the other (eſpecially ſeeing no generation can proceed without water:) and yet keeps the ſame tenor and degree of heat, according to the nature of the minerals fermenting, and to the diſtance from the place of eruption. And this is a far more probable cauſe of the continuance of our Bathes, then any ſubterranean deſtructive fire can be, or any other of the ſuppoſed cauſes can yield. I do not deny but that hot Bathes may ceaſe and become cold; as *Ariſtotle* faith of Salt Fountains which are cold, that

2 *Meteorol. c.2.*

they were once hot, before the original of their heat was extinct: which I interpret to be when the work of generation ceaſed, and the Salt brought to his perfection. But I do not read of any hot Bathes that have ceaſed: unleſs near unto ſome Vulcano, where either the ſinking of Rocks hath altered the courſe of them, as at *Tripergula* and *Baia*, or the flaming fire which heated them at their eruption being extinguiſhed, as in the *Æolian* Iſlands. Theſe Vulcanoes are far more ſubject to decay then our generative heat, becauſe they conſume their fuel; this doth not, but increaſeth it daily, *vireſque acquirit eundo.* Of the other *Ovid* ſaith,

Nec quæ ſulphureis ardet fornacibus Ætna
Ignea ſemper erit; neq; enim fuit ignea ſemper.

Ætna with its ſulphureous flames will dy,
And as a kindling had, will want ſupply.

But of this we can hardly bring an Inſtance of any that have decayed; becauſe where a generation is begun, there ſeldome or never wants matter to propagate and enlarge it. And ſeeing minerals have not their ſeeds in their individuals, as animals & vegetables have, but in their wombs, as hath been ſhewed before; it were to be feared that there would be a decay of mineral ſpecies, and ſo a *vacuum* left in nature, if theſe generations ſhould be no more durable then the other. Animals are propagated by begetting of heir ſpecies, the power whereof is in every individual, which, no doubt, will not give over this trade as long as the world laſteth. Vegetables are alſo fruitfull in their kinds, every one producing 100, or perhaps 1000 ſeeds of individuals yearly, to perpetuate their ſpecies. Minerals have no ſuch means, but only have their ſeeds in their wombs, whereby they are propagated: and if theſe generations, being longer in perfecting of their ſpecies, were not ſupplyed with a larger extent for their productions; nature had been defective in not providing ſufficient means for their perpetuity, as well as for others, and might eaſily ſuffer a decay, and a vacuity of mineral ſpecies; which agrees not with the providence of nature, and the ornament of the world. The neceſſity hereof depends upon the firſt benediction, (*creſcite & multiplicamini*) which, no doubt belongs as well to minerals in their kinds, as it doth to animals and vegetables, and by vertue hereof we ſee that they are propagated daily, as I have proved before, Cap. 11. And this is that neceſſity whereof *Hypocrates* ſpeaks, and that *fatum naturale inhærens rebus ipſis*, Natural fate inherent in things themſelves, as *Lipſius* ſaith; and that *Lex Adraſtiæ* mentioned by *Ariſtotle* and *Galen*, *Locis ante citatis*, ſo firmly eſtabliſhed, as nothing can contradict it. Arithmetick, Geometry, and Logick, which are but attendants upon nature, have their principles ſo firmly grounded as nothing can ſhake them; and ſhall we think that nature it ſelf is grounded upon weaker foundations? wherefore we need not doubt of the perpetuity of theſe generations, but that a ſome parts attain to their perfection, ſo othe

Triſmegiſtus in Aſclepio. c. 7. In Pimandro cap. 1.

Lib. de conſtat.

part

parts will be alwayes *in fieri* or *in via ad generationem:* whereby our Bathes will never fail of their heat or their virtues.

This I hope is ſufficient for the confuting of other opinions, and the clearing of mine own from all abſurdities concerning the degree of heat, which is as much as the nature of water can endure without utter diſſipation: concerning the equal tenor of the heat, the duration of it, the participation of mineral qualities, &c. The other kind of confirmation which we call Apodeictical, is alſo here and there diſperſed in this Diſcourſe: as that all minerals have their continual generation: that this generation is not without heat and moyſture, which do neceſſarily attend all generations: that few mineral ſubſtances or qualities can be imparted to water, but whilſt they are in generation, and yet we find them much impregnated with them: that our Miners do find an actual heat, and in a high degree, in the digging of Minerals, where the fermentation is not throughly extinct: that we obſerve the like courſe of nature in the generations of animals and vegetables: that we are led to the acknowledgement hereof by many artificial concluſions and artifices, &c. Wherefore I forbear to make any larger repetition hereof.

And this is in brief (though plainly delivered) my opinion concerning the actual heat of Baths, and of the mineral qualities which we find in them; which I refer to the cenſures of thoſe that be learned.

There are two other motions which reſemble this fermentation: The one is *Motus dilatationis*, the other *Antipatheticus*. *Motus dilatationis* is evident in Lime, in Allum, in Copperaſs, and other concrete juyces, whereby the affuſion of water, the Salt in the Lime, or the concrete juyces being ſuddenly diſſolved, there is by this motion, an actual heat procured for a time, able to kindle any combuſtible matter put to it.

The like we obſerve in thoſe ſtone Coals, called metal Coals, which are mixed with a Marcheſit containing ſome mineral juyce, which receiving moyſture, doth dilate it ſelf, and grows ſo hot, as oftentimes great heaps of thoſe Coals are kindled thereby, and burnt before their time; as hath been ſeen at *Puddle-Wharf* in *London*, and at *Newcaſtle*. But this is much different from our fermentation.

Another *Motus* reſembling this fermentation, is that which is attributed to Antipathy, when diſagreeing ſubſtances being put together, do fight, and make a manifeſt actual heat; as Antimony and Sublimat, oyle of Vitriol and oyle of Tartar, Allum liquor and Urine, Lees, Chalk, &c. But the reaſon of this diſagreement is in their Salts, whereof one is aſtringent, the other relaxing; the one of eaſie diſſolution in water, the other of hard diſſolution, &c. where one mineral hinders the diſſolution or congelation of another; and not by reaſon of any antipathy: for it is not likely that nature would produce two contrary ſubſtances mixed like atomes in one ſubject, but that in their very generations the one would be an impediment to the other. So in vegetables where one plant ſucks away the nouriſhment from another, we call it antipathy. But if we examine aright what this ſympathy and antipathy is, we ſhall find it to be nothing but a refuge of ignorance, when not being able to conceive the true reaſons of ſuch actions & paſſions in natural things, we fly ſometimes to indefinite generalities, and ſometimes to this inexplicable ſympathy and antipathy; attributing voluntary, and ſenſitive actions and paſſions to inſenſible ſubſtances. This *motus* alſo is much different from fermentation, as may eaſily appear by the former deſcription. And thus much for this point of fermentation, which I hope will give better ſatisfaction then any of the former opinions.

CHAP. XV.

y what means it may be diſcovered what minerals any water containeth.

THE nature of minerals and their generations being handled, and from thence the
aſons drawn, both of the actual heat of Bathes,
d of their qualities: Now it is fit we ſhould
ek out ſome means how to diſcover what mi-
rals are in any Bath, that thereby we may the-
tter know their qualities, and what uſe to
ke of them for our benefit. Many have at-
npted this diſcovery, but by ſuch weak means,
l upon ſuch poor grounds, as it is no marvail
they have failed of their purpoſe: for they
e contented themſelves with a bare diſtilla-
1 or evaporation of the water, and obſerving
the

the ſediment, have thereby judged of the minerals, unleſs perhaps they find ſome manifeſt taſte, or ſmell, or colour in the water, or ſome unctuous matter ſwimming above it. Some deſire no other argument of Sulphur and Bitumen, but the actual heat: as though no other minerals could yield an actual heat, but thoſe two: But this point requires better conſideration; and I have been ſo large in deſcribing the natures and generations of minerals, becauſe without it, we cannot diſcern what minerals we have in our waters, nor judge of the qualities and uſe of them.

Our Minerals therefore, are either confuſed or mixed with the water. If they be confuſed they are eaſily diſcerned: for they make thewater thick and pudly, and will either ſwim above, as Bitumen will do, or ſink to the bottom, as Earth, Sulphur, and ſome terreſtrial juices; for no confuſed water will remain long unſeparated. If they are perfectly mixed with the water, then their mixture is either corporal, where the very body o the Mineral is imbibed in the water, or ſpiritual where either ſome exhalation, or ſpirit, or tincture is imparted to the water.

Corporally there are no minerals mixed wit water, but juices, either liquid, as *ſuccus lapideſcens, metallificus*, &c. before they are perfectly congealed into their natural conſiſtenc or concrete, as Salt, Nitre, Vitriol, and Allum theſe concrete juices do not diſſolve themſelv in water, but oftentimes bring with them ſom tincture or ſpirit from other Minerals. For water is apt to recive juices, and tinctures, a

ſpiri

ſpirits from animals, and vegetables; ſo are concrete juices, being diſſolved, apt to extract tinctures and ſpirits from minerals, and to communicate them with water. And there are no Mines, but have ſome of theſe concrete juices in them, to diſſolve the materials of them, for their better union and mixture: and there are few minerals or metals, but have ſome of them incorporated with them; as we ſee in Iron, and Copper, and Tin, and Lead, &c. And this is the reaſon that water being long kept in Veſſels of any of theſe metals, will receive a taſte or ſmell from them, eſpecially if it be attenuated, either by heat, or by addition of ſome ſour juice; and yet more, if the metals be fyled into powder as we ſee in making Chalibeat Wine, or Sugar of Lead, or Puttie from Tin, or Verdegreaſe from Copper. There may be alſo a mixture of ſpiritual Subſtance from minerals, whilſt they are in generation, and *in Solutis Principiis*: the water paſſing through them, and the rather if it be actually hot, for then it is more apt to imbibe it, and will contain more in it, being attenuated by heat, then being cold; as we ſee in Urins, which though they be full of humours, yet make no great ſhew of them ſo long as they are warm, but being cold, do ſettle then to the bottom.

Theſe ſpiritual ſubſtances are hardly diſcerned in our Bathes, but by the effects; for they leave no reſidence after evaporation; and are commonly as volatile in ſublimation as the water it ſelf: neither do they increaſe the weight of the water, nor much alter the taſte or ſmell of them, unleſs they be very plentiful. Wherefore we have no certain way to diſcover them, but by the effects. We may conjecture ſomewhat of them by the Mines which are found near unto the Bathes, and by the mud which is brought with the water. But that may deceive, as coming from the paſſages through which the water is conveyed, or, perhaps, from the ſweat and ſtrigments of mens bodies which bathe in them. The corporal ſubſtances are found, either by ſublimation or by precipitation. By ſublimation, when being brought to the ſtate of congelation, and ſticks of Wood put into it, within a few dayes, the concrete juices will ſhoot upon the wood; in Needles, if it be Nitre; in Squares, if be Salt; and in Clods and Lumps, if it be Allum or Coperaſs, and the other mineral ſubſtances which the waters have received, will either incorporate a tincture with them, or if it be more terreſtrial, will ſettle and ſeparate from it, and by drying it at a gentle fire, will ſhew from what houſe it comes, either by colour, taſte, ſmell, or vertue: There is another way by precipitation, whereby thoſe mineral ſubſtances are ſtricken down from their concrete juices which held them, by addition of ſome oppoſite ſubſtance: And this is of two ſorts: either Salts, as Tartar, Soap-aſhes, Kelps, Urine, &c. Or ſour juices as Vinegar, Lemons, oyle of Vitriol, Sulphur, &c. In which I have obſerved that the Salts are proper to blew colours, and the other to red; for example, take a piece of Scarlet cloath, and wet it in oyle of Tartar (the ſtrongeſt of that kind) and it preſently becomes blew: dip it again in oyle of Vitriol, and it becomes red again. *Pe-*

notus hath a ſtrange precipitating water from Tin, Mercury, Alkali, &c. which ſeparate any minerals; *Fides ſit penes authorem.*

Theſe are the chief grounds of diſcovering mineral waters, according to which any man may make tryal of what waters he pleaſeth. I have been deſirous heretofore to have attempted ſome diſcovery of our Bathes, according to theſe principles: but being thought (by ſome) either not convenient, or not uſefull, I was willing to ſave my labour; which perhaps might have ſeemed not to be worth thanks; and in theſe reſpects am willing now alſo to make but a bare mention of them.

CHAP. XVI.

Of the uſe of Mineral Waters, inwardly, outwardly. In this Chapter is ſhewed the inward uſe of them, firſt in general; then particuly of the hot waters of Bathe.

THE nature and generations of Minerals being handled, and how our mineral waters receive their impreſſions, and actual heat from thence; and by what means they are to be tried, what Minerals are in each of them. Now we are to ſhew the uſes of them; which muſt be drawn from the qualities of the Minerals whereof they conſiſt; which are ſeldome one or two, but commonly more. Theſe qualities are either the firſt, as hot, cold, moyſt, and dry; or the ſecond, as penetrating, aſtringent, opening, reſolving, attracting, cleanſing, mollifying, &c.

For the firſt qualities, it is certain and agreed upon by all Authors; that all mineral waters do dry exceedingly, as proceeding from earth; but ſome of thoſe do cool withall, and ſome do heat.

Cooling waters are good for hot diſtempers of the Liver, Stomach, Kidneys, Bladder, Womb, &c. Alſo for Salt diſtillations, ſharp humours, light obſtructions of the Meſeraicks, &c.

Heating waters are good for cold affects of the Stomach, Bowels, Womb, Seminary Veſſels, cold diſtillations, Palſies, &c.

For the ſecond qualities, cleanſing waters are good in all Ulcers, eſpecially of the Guts.

Mollifying waters; for all hard and ſchirrous Tumors.

Aſtringent waters, for all Fluxes, &c. and ſo of the reſt.

Now theſe waters are uſed either inwardly or outwardly.

Inwardly, either by mouth, or by injection.

By mouth, either in potion, or in Broths, Juleps, &c.

6 *De tuenda ſanitat. cap.* 9.

Galen never uſed them inwardly, becauſe he judged their qualities to be diſcovered by experience, rather then by reaſon. And ſeeing we find many of them to be venomous, and deadly, as proceeding from Arſenick, Sandaracha, Cadmia, &c. we had need be very wary in the inward uſe of them.

Neptunes Well in *Tarracina* was found to be ſo deadly, as it was therefore ſtopped up. By *Monpellier* at *Perant* is a Well which kills all the

Fowls that drink of it; the lake *Avernus* kills the Fowls that fly over it; ſo doth the vapour ariſing from *Charons* Den between *Naples* and *Puteolum*. So there are divers waters in *Savoy* and *Rhetia*, which breed ſwellings in the throat. Others proceeding from *Gipſum* do ſtrangle, &c. But where we find waters to proceed from wholſome Minerals, and ſuch as are convenient, and proper for our intents, there we may be bold to uſe them as well inwardly as outwardly: yet ſo as we do not imagine them to be ſuch abſolute remedies, as that they are of themſelves able to cure diſeaſes without either rules for the uſe of them, or without other helps adjoyned to them. For as it is not enough for a man to get a good Damaſco or Bilbo-blade to defend himſelf withall, unleſs he learn the right uſe of it from a Fencer; ſo it is not enough to get a medicine and remedy for any diſeaſe, unleſs it be rightly uſed, and this right uſe muſt come from the Phyſitian, who knows how to apply it, and how to prepare the body for it, what to add and joyn with it, how to govern and order the uſe of it, how to prevent ſuch inconveniences as may happen by it, &c.

Wherefore, where we ſpeak of any Mineral water, or of any other medicine that is proper for ſuch and ſuch a grief, we muſt be ſo underſtood, that the medicine is not wiſe enough to cure the diſeaſe of it ſelf, no more than a ſword is able of it ſelf to defend a man, or to offend his enemie, but according to the right and skilfull uſe of it. And as it is not poſſible for a Fencer to ſet down abſolute rules in writing for his Art, whereby a man may be able in reading of them to defend himſelf; no more is the Phyſitian poſſibly able to direct the particular uſes of his remedy, whereby a patient may cure himſelf without demonſtration and the particular direction of the Phyſitian. It is true, that we have general rules to guide us in the cure of diſeaſes, which are very true and certain; yet when we come to apply them to particular perſons, and ſeveral conſtitutions, theſe general rules are not ſufficient to make a cure, but it muſt be varied according to ſubſtance. Hereupon we daily find, that thoſe patients which think to cure themſelves, out of a little reading of ſome rules or remedies, are oftentimes dangerouſly deceived. And this is enough to intimate generally concerning the uſes of our Mineral waters.

Inwardly we find great and profitable uſe of ſuch waters as proceed from Nitre, Allum, Vitriol, Sulphur, Bitumen, Iron, Copper, &c. Examples whereof I have ſet down before in the ſeveral Minerals, referring the particular uſes of each to ſuch Authors as have purpoſely deſcribed them.

Baths of *Bath* conſiſt principally of Bitumen, with Nitre, and ſome Sulphur.

My intent is chiefly to apply my ſelf to thoſe Baths of *Bath* in *Sommerſet-ſhire*; which conſiſting, as I judge, principally of Bitumen, with Nitre, and ſome Sulphur, I hold to be of great uſe both inwardly and outwardly. And I am ſorry that I dare not commend the inward uſe of them as they deſerve, in regard I can hardly be perſwaded that we have the water pure, as the ſprings yield them, but do fear, leſt where we take them, they may be mixt with the water of the Bath. If this doubt were cleared, I ſhould not doubt to commend them inwardly, to heat, dry, mollifie, diſcuſs, glutinate, diſſolve, open obſtructions, cleanſe the kidneys and bladder, eaſe cholicks, comfort the matrix, mitigate fits of the mother, help barrenneſs proceeding from cold humors, &c. as *Tabernomontanus* affirms of other Bituminous Baths. Alſo in regard of the Nitre, they cut and diſſolve groſs humors, and cleanſe by urine. In regard of the Sulphur, they dry and reſolve, and mollifie, and attract, and are eſpecially good for uterine affects proceeding from cold and windy humours.

Theſauri aquarii pag. cap. 40.

And I would wiſh theſe waters to be drunk hot as they are, for better penetration, and leſs offence to the ſtomach. The antient Grecians and Romans did drink moſt of their water and wine hot, as we find in many Authors, which *Salmuth* hath diligently collected: and *Anthonius Percius* hath purpoſely written a book of it, entituled *Dei bever caldo coſtumato da gli Antichi*. We find alſo that it is in uſe at this day, both in the *Eaſt-Indies* and in *Turkey*, where they have a drink called *Capha*, ſold ordinarily in Taverns, and drunk hot, although in the Summer. *Verulamius* doth marvel that it is ſo much grown out of uſe, and adviſeth to drink our firſt draught at our meals, hot. There is great reaſon for it, both for preſervation of health, and for cure of many diſeaſes. The ſtomach being a nervous part, muſt needs be offended by that which is actually cold: and being the ſeat of natural appetite, and of the firſt concoction (whoſe errors and defects are not amended in the other concoctions) had need to be preſerved in his native

In Pancirollum de deperditis pag. 540.

Proſper. Alpinus de medic. Ægyptiorum l. 4. *c.* 3. *De vita & morte pag.* 304.

Warm drink commended.

vigour and ſtrength, that it may breed good nouriſhment for the whole body. But the much uſe of cold drink, although it ſeem to refreſh us for the preſent, by dulling the appetite and the ſenſe of thirſt and hunger, as a ſtupefactive narcotick will do: yet it deſtroys the faculties of the ſtomach, which are maintained and quickned by heat: and thereby breeds crudities in our bodies, from whence many diſeaſes proceed. The *Eaſt-Indians* are ſeldome troubled with the Stone or the Gout, and it is imputed to their warm drink: the like we may judge of obſtructions, cholicks, dropſies, rheumes, coughs, hoarſneſs, diſeaſes in the throat and lungs, &c. in which caſes, and many more which proceed from ill concoction and crudity of humors, no doubt it is an excellent preſervative to drink our drink warm. I know a worthy Gentleman of excellent parts, who in his travels obſerved the benefit hereof, and for many years hath uſed to take his drink hot: and being now above 80 years old, enjoyeth his health of body, and vigour of ſpirits, beyond the ordinary courſe of men of his age. Likewiſe in the cure of diſeaſes, I perſwade my ſelf it would prove very profitable, if it were in uſe. For example in feavers, I ſee no reaſon but it would do more good than our cold waters, juleps, poſſet-drinks, &c. which I approve well of, but if the patient did drink them hot, the ſtomach would be leſs offended thereby, the moyſture (which we chiefly deſire in them) would penetrate more, and the eventilation by ſweat or inſenſible tranſpiration, would not be hindred. *Hypocrates* is very plain in this point, and reckons

I. W.

Lib. de humidorum uſu.

reckons many inconveniences of cold drinks, to the teeth, bones, nerves, breſt, back, lungs, ſtomach, &c. I will not inſiſt longer hereupon, being a practical point of Phyſick: only I thought good to intimate it to our learned Phyſitians to contemplate upon, for the benefit of our patients.

Our *Bath* Guides do uſually commend the drinking of this water with ſalt to purge the body, perſwading the people that the *Bath*-water hath a purging quality in it, when as the ſame proportion of ſpring-water, with the like quantity of ſalt will do the like. Our Baths have true virtues to commend them, ſo as we need not ſeek to get credit or grace unto them by falſe ſuggeſtions. The Bitumen and Nitre which is in them, although it ſerves well for an alterative remedy, yet it is not ſufficient for an evacuative: and therefore we muſt attribute this purgative quality, either to the great quantity of water which they drink (and ſo it works) *ratione ponderis*) or unto the ſtimulation of ſalt which is diſſolved in it, or unto both together. Our common ſalt hath a ſtimulating quality, as is ſhewed before, Chap. 7. and *Eraſtus* ſaith that it purgeth much. *Bulcaſis* gives it to that purpoſe from ʒ *ij* to ʒ *iiij*. *Meſue* alſo preſcribes it to purge groſs humors, and ſo doth *Avicen*. Wherefore there is no doubt but ſalt will purge of it ſelf, being diſſolved in our *Bath*-water. But I ſhould ke much better to diſſolve in it ſome appropriate ſyrup or other purgative, for this purpoſe, as Manna, Tartar, Elaterium, ſyrups of Roſes, of Cichory, with Rhubarb, Auguſtanus; or to move

Simpl.cap. 16. *lib.*5. *ſum* 1. *tract.*4. *& lib.* 2. *tract.*2.*cap.* 624.

move urine, *Syr. de 5. rad. Bizantinus de Limonibus, Sambucinus, de Althea, &c.* And this courſe is uſual in *Italy*, according as the Phyſitian ſees moſt convenient, but with this caution, that when they take it in potion, they muſt not uſe the *Bath*, becauſe of contrary motions.

Baccius lib. 2. Claudinus p. 377. De aere, aquis & locis.

Inwardly alſo *Bath*-waters are uſed, for Broths, Beer, Juleps, &c. although ſome do miſlike it, becauſe they will not mix medicaments with aliments: wreſting a text in *Hypocr.* to that purpoſe. But if we may mix Diureticks, Deoppilatives, Purgatives, &c. with aliments, as uſually we do: I ſee no reaſon but we may as well uſe mineral waters, where we deſire to make our aliments more alterative by a medicinal quality, alwaies provided that there be no malignity in them, nor any ill quality which may offend any principal part. And thus much for the uſe o them by mouth.

By injection they are uſed alſo into the Womb, to warm, and dry, and cleanſe thoſe parts; into the paſſages of urine, to dry and hea excoriations there; into the fundament for lik cauſes, as alſo for reſolutions of the Sphincter and bearing down of the fundament, &c. And thus they are uſed either alone, or mixed wit other medicines, according as the Phyſitian think moſt fit, and we daily find very good ſucceſ thereby in uterine affects, depending upon col cauſes. Thus much for the inward uſe of our *Bath*-waters.

CHAP. XVII.

Of the outward uſe of the the Hot Waters of Bathe; *firſt, the general uſe of them to the whole body in Bathing: ſecondly, the particular uſe of them by pumping, bucketing, or applying the mud.*

OUtwardly our Bath-waters are principally uſed, becauſe they are moſt properly for ſuch affects as are in the habit of the body, and out of the veins: as Palſies, Contractions, Rheums, cold Tumors, affects of the skin, aches, &c. And in theſe caſes we uſe not only the water, but alſo the mud, and in ſome places the vapour.

The water is uſed both for his actual and potential heat, as alſo for the ſecond qualities of mollifying, diſcuſſing, cleanſing, reſolving, &c. which the minerals give unto it. The uſe hereof is either general to the whole body, as in bathing; or ſome particular to ſome one part, as in bucketing or pumping, which antiently was called *Stillicidium*. The *Italians* call it *Duccia*. The general uſe in Bathing, is moſt antient: for our Bathes were firſt diſcovered thereby to be wholſome and ſoveraign in many diſeaſes.

Nechams Verſes concerning the uſe of theſe Bathes, are four hundred years old.

Bathoniæ Thermas vix præfero Virgilianas
Confecto proſunt Balnea noſtra ſeni:
Proſunt attritis, colliſis invalidiſque,
Et quorum morbis frigida cauſa ſubeſt.

Which I will Engliſh out of Dr. *Hackwels* learned work of the perpetuity of the world.

Our Bains at Bathe with *Virgils* to compare;
For their effects, I dare almoſt be bold,
For feeble folk, and crazie good they are,
For bruiz'd, conſum'd, far ſpent, and very old,
For thoſe likewiſe whoſe ſickneſs comes of cold.

We have antient traditions (*fama eſt obſcurior annis*) That King *Bladud* who is ſaid to have lived in the time of *Elias*, did firſt diſcover theſe Bathes, and made tryal of them upon his own Son, and thereupon built this City, and diſtinguiſhed the Bathes, &c. But we have no certain record hereof. It is enough that we can ſhew the uſe of them for 400 years, and that at this day they are as powerful as ever they were: *Cambden* gives them a more antient date from *Ptolomy* and *Antonine*, and the *Saxons*: and ſaith they were called *Aquæ Solis*, and by the *Saxons*, *Akmancheſter*, that is, the town of ſick people, and dedicated to *Minerva*, as *Solinus* ſaith. The opinion that the Bathes were made by Art, is too ſimple for any wiſe man to believe, or for me to confute: And *Necham* in his Verſes which follow after thoſe I have mentioned, doth hold it a figment: you may ſee them in *Cambden*. We have them for their uſe in bathing, diſtinguiſhed into four ſeveral Bathes, whereof three have been antiently; namely the KingsBath, the Hot Bath and the Croſs Bath. The Queens Bath was taken from the Springs of the Kings Bath, that being farther off, from the hot Springs, it might ſerve for ſuch as could not endure the heat of the other. We have likewiſe an appendix to the hot Bath, called the Leapers Bath, for unclean perſons. We find little difference in the nature of theſe Bathes, but in the degree of heat, proceeding no doubt, from one and the ſame Mine. Yet as the Mine may be hotter in one part then in another, or the paſſages more direct from it, ſo the heat of them may vary. Some little difference alſo we find among them, that one is more cleanſing then another, by reaſon (as I take it) of more Nitre. For in the croſs Bath we find that our fingers ends will ſhrink and ſhrivel, as if we had waſhed in Soap-water, more then in the other Bathes. The Kings Bath, as it is the hotteſt of all the Bathes, ſo it is the fitteſt for very cold diſeaſes, and cold and phlegmatick conſtitutions: And we have daily experience of the good effects it worketh upon Palſies, Aches, Sciatica's, cold Tumors, &c. both by evacuation, by Sweat, and by warming the parts affected, attenuating, diſcuſſing, and reſolving the humors: Alſo in Epilepſies and Uterin affects in the Scorbute, and in that kind of dropſie which we call Anaſarca. The hot Bath is little inferiour unto it, as next in degree of heat, and uſefull in the ſame caſes. The Queens Bath, and Croſs Bath are more temperate in their heat, and therefore fitteſt for tender bodies, which are apt to be inflamed by the other, and where here is more need of mollifying and gentle warming, then of violent heat and much evacuaion by ſweat. And in theſe Bathes they may ndure longer without diſſipation of Spirits, then in the other: the Queens Bath is the hotter of the two, but temperate enough for moſt bodies. The Croſs Bath is the coldeſt of all; as having but few Springs to feed it: yet we obſerve it to ſupple, and mollifie more then the reſt, both becauſe they are able to ſtay longer in it, and becauſe (as I ſaid before) it ſeems to participate more with Nitre, then the reſt, which doth cleanſe better, and gives more penetration to the other Minerals. Wherefore in contractions, Epilepſies, Uterin affects, Convulſions, Cramps, &c. This Bath is very uſeful; as alſo in cutaneal diſeaſes, as Morphews, Itch, &c. Thus much for the nature and difference of our Bathes, and the general uſe in bathing.

They are uſed alſo to particular parts by pumping or bucketing, or applying the mud.

Pumping or bucketing are not uſed in that faſhion, as we uſe them in any other Bathes that I can learn, but only the Duccia or Stillicidium: But I hold our faſhion as good as that. The water comes more plentifully upon the part, and may be directed as the patient hath occaſion. Our bucketing hath been longeſt in uſe: but finding that it did not heat ſome ſufficiently, being taken from the ſurface of the Bath, we have of late erected Pumps, which draw the water from the ſprings or near unto them, ſo as we have it much hotter from thence, then we can have it by bucketing. A worthy Merchant and Citizen of *London*, Mr. *Humphrey Brown*, was perſwaded by me to beſtow two of theſe Pumps upon the Kings and Queens Bath, whereby he hath done much good to many, and deſerves a thankfull remembrance. The like alſo I procured to be done at the other Bathes, although that of the Croſs Bath is not ſo uſeful, by reaſon it wants heat, unleſs for yong Children. Alſo we have a Pump out of the hot Bath, which we call the dry Pump, where one may ſit in a Chair in his Cloaths, and have his Head, or Foot, or Knee pumped without heating the reſt of the body in the Bath; and deviſed chiefly for ſuch as have hot Kidneys, or ſome other infirmities which the Bath might hurt. This we find very uſefull in Rheums, and cold Brains, and in Aches and Tumors in the Feet. For theſe Pumps we are beholding unto the late Lord Archbiſhop of *York*, and to Mr. *Hugh May*, who upon my perſwaſions were contented to be at the charge of them. It were to be wiſhed that ſome well diſpoſed to the publick good, would erect the like at the Kings Bath; † where, perhaps, it might be more uſefull for many, in regard of the greater heat which thoſe ſprings have.

† This is now done, and a dry Pump there erected in the year 1661. at the City charge, by the procurement of Mr. *John Ford*, Apothecary, then Mayor of the City.

The lute of Bathes is in much uſe in ſome places, where it may be had pure, both to mollifie, and to reſolve, and to ſtrengthen weak parts. But we make little uſe of it in our Bathes, becauſe we cannot have it pure, but mixed with ſtrigments. In divers other places either the ſprings ariſe a good diſtance from the bathing places, or elſe there be other eruptions from whence it may be taken. But our ſprings ariſing in the Bathes themſelves, it cannot well be ſaved pure. Beſides, we have not thoſe means of the heat of the Sun, to keep it warm to the parts where it is applyed: ſo as growing cold, it rather does hurt then good. Wherefore it were better for us, to uſe artificial lutes, as the Antients did, of Clay, Sulphur, Bitumen, Nitre Salt, &c. or unguents of the ſame nature, as tha which they call Ceroma. But the beſt way is to referr the election of theſe remedies to the preſent Phyſitian, who will fit them according to the nature of the grief.

CHAP. XVIII.

In what particular Infirmities of the Body, bathing in the Hot Waters of Bathe *is profitable.*

TO come more particularly to the uſe of bathing, we muſt underſtand, that there are many mineral waters fit for bathing, which are not fit to drink: as thoſe which participate with Lead, Quickſilver, Gypſum, Cadmia, Arſenick, &c. Alſo thoſe that contain liquid Bitumen, are thought to relax too much: but thoſe that proceed from dry Bitumen are permitted, and preſcribed in potion by *Paulus Ægineta*, and *Trallian*: Sulphur alſo is queſtioned, whether it be fit to be taken inwardly by Potion, becauſe it relaxeth the ſtomach, and therefore *Aetius* forbids it: yet *Trallian* allows it, and ſo do others, if the Sulphur be not predominant. But for outward bathing there is no queſtion to be made of theſe Minerals, not of any other which are not in themſelves venomous.

1 *Tetrab. ſerm. 3 cap.* 167. *Trallian. l.*10. *cap.* 1.

And whereas *Oribaſius*, *Ægineta*, *Actuarius*, *&c.* are ſuſpitious of Sulphur and Bitumen for the head: they muſt be underſtood of hot diſtempers there, and not of cold rheumatick brains; where by daily experience we find the profitable uſe of them, both by evacuation in bucketing, and by warming and comforting the cold part. And *Oribaſius* doth ingeniouſly confeſs, that the nature of theſe Baths was not then perfectly diſcovered; and therefore they were all held to be, not only dry, but very hot; although we find them not all ſo: for Iron waters do cool, and ſo do thoſe of Camphir, and Alluminous, and Nitrous waters alſo. But for our Bituminous and Sulphurous waters which *Galen* forbids in hot brains, there is no reaſon to ſuſpect them in cold affects of the brain and nerves, in which caſes we make eſpecial choice of all things, which either in taſt or ſmell do reſemble Bitumen: as Rue, Caſtorium, *Valeriana*, *Herba Paralyſeos*, *Trifolium*, *Aſphaltitis*, *&c.* which both by his warming quality, and by his ſuppling and mollifying ſubſtance, is moſt proper and convenient for thoſe parts. The like I may ſay of Sulphur, in which nothing can be excepted againſt, but his ſharp ſpirit, which is made by burning: and we have none of that in our waters, nor I hope any fire to make it withal. The other parts of Sulphur are hot and dry, and very unctuous. As for Nitre, it cleanſeth, purgeth both by ſtool and urine, and helpeth the incorporation of the other Minerals with the water, and qualifies the heat of them, and gives them better penetration

Orib.l.10.c.3.
Ægin.l.1.c.52.
Actu.l.3.c.10.

Cap. 5.

Hypoc. de aere, aquis, & locis.

6.de tuenda ſanitate cap.9.

into our bodies. In regard of theſe Minerals, together with the actual heat, we find that the bathing in our *Baths* doth warm the whole habit of the body, attenuate humors, open the pores, procure ſweat, move urine, cleanſe the matrix, provoke womens evacuations, dry up unnatural humors, ſtrengthen parts weakned, comfort the nerves, and all neutrous parts, cleanſe the skin, and ſuck out all ſalt humours from thence, open obſtructions, if they be not too much impacted, eaſe pains of the joynts and nerves and muſcles, mollifie and diſcuſs hard tumors, &c. Wherefore this bathing is profitable for all palſies, apoplexies, caros, epilepſies, ſtupidity, defluctions, gouts, ſciaticaes, contractions, cramps, aches, tumors, itches, ſcabs, leproſies, cholicks, windyneſs, whites in women, ſtopping of their courſes, barrenneſs, abortions, ſcorbuts, anaſarcaes, and generally all cold and phlegmatick diſeaſes, which are needleſs to reckon up. In all which cures our *Baths* have a great hand, being skilfully directed by the Phyſitian, with preparation of the body before, and addition of ſuch other helps as are needfull. And whereas without the help of ſuch Baths, theſe diſeaſes could not be cured without tormenting the body, either by fire, or lancing, or cauſticks, or long dyets, or bitter and ungrateful medicines, &c. In this courſe of bathing, all is pleaſant and comfortable, and more effectual than the other courſes, and therefore it is commonly the laſt refuge in theſe caſes, when all other means fail. I will not undertake to reckon up all the benefits which our Baths do promiſe; but if we had a regiſter kept of the manifold cures which have been done by the uſe of our Baths principally, it would appear of what great uſe they are. But as there is a defect in not keeping a Catalogue of rare Cures, ſo many perſons of the better ſort would be offended, if a Phyſitian ſhould make any mention of their cures or griefs: wherefore I muſt ſpeak but generally.

CHAP. XIX.

The manner of bathing, chiefly referred to the inſpection and ordering of a Phyſitian. Yet ſome particulars touched concerning the government of the patient in and after bathing; the time of day, of ſtaying in the Bath, *of continuing the uſe of it, The time of the year. Of covering the* Baths.

NOw for the manner of bathing, I will not ſet down what the Phyſitian is to do, but leave that to his judgement and diſcretion; but what is fit for the patient to know: for there are many cautions and obſervations in the uſe of bathing, drawn from the particular conſtitutions of bodies; from the complication of diſeaſes, and from many other circumſtances which cannot be comprehended in general rules, or applyed to all bodies alike: but many times upon the ſucceſs, and the appearing of accidents, the Phyſitian muſt *ex re nata capere conſilium*, and perhaps alter his intended courſe, and perhaps change the *Bath* either to a hotter or cooler, &c. In which reſpect, thoſe patients are ill adviſed which will venture without their Phyſitian upon any particular Bath, or to direct themſelves in the uſe of it: And this is a great cauſe that many go away from hence without benefit, and then they are apt to complain of our Baths, and blaſpheme this great bleſſing of God beſtowed upon us.

It is fit for the patient when he goeth into the *Bath*, to defend thoſe parts which are apt to be offended by the *Bath*: as to have his head well covered from the air and wind, and from the vapours ariſing from the *Bath*: alſo his kidneys (if they be ſubject to the Stone) anointed with ſome cooling unguents; as *Roſatum Comitiſſæ*, *Infrigidans Galeni*, *Santolinum*, *&c.* Alſo to begin gently with the *Bath*, till his body be inured to it, and to be quiet from ſwimming, or much motion, which may offend the head by ſending up vapours thither: at his coming forth, to have his body well dryed, and to reſt in his bed an hour, and ſweat, &c.

A morning hour is fitteſt for bathing, after the Sun hath been up an hour or two; and if it be thought fit to uſe it again in the afternoon, it is beſt four or five hours after a light dinner. For the time of ſtaying in the *Bath*, it muſt be according to the quality of the *Bath*, and the toleration of the patient. In a hot Bath, an hour or leſs may be ſufficient: in a temperate Bath, two hours. For the time of continuing the Bath, there can be no certain time ſet down, but it muſt be according as the patient finds amendment, ſometimes twenty daies, ſometimes thirty, and in difficult caſes much longer. And therefore they reckon without their Hoſt, which aſſign themſelves a certain time, as perhaps their occaſions of buſineſs will beſt afford. For the time of the year, our Italian and Spaniſh Authors prefer the Spring and Fall; and ſo they may well do in their hot Countreys; but with us, conſidering our climate is colder, and our Baths are for cold diſeaſes; I hold the warmeſt moneths in the year to be beſt; as *May*, *June*, *July*, and *Auguſt*, and I have perſwaded many hereunto who have found the benefit of it; for both in our Springs, and after *September* our weather is commonly variable, and apt to offend weak perſons, who finding it temperate at noon, do not ſuſpect the coolneſs of the mornings and evenings. Likewiſe in the Bath it ſelf, although the Springs ariſe as hot as at other times, yet the wind and air beating upon them, doth do them much harm, and alſo make the ſurface of the water much cooler than the bottom: and therefore *Claudinus* wiſheth all Baths to be covered, and *Fallopius* finds great fault with the Lords of *Venice*, that they do not cover their Bath at *Apono*. We ſee alſo that moſt of the Baths in *Europe* are covered, whereby they retain the ſame temperature at all times. And it were to be wiſhed that our Queens Bath, and Croſs-Bath, being ſmall Baths, were cover-

ed,

ed, and their Slips made cloſe and warm. By this means our Baths would be uſeful all the year, when neither wind and cold air in Winter, nor the Sun in Summer ſhould hinder our bathing. Moreover, for want of this benefit, many who have indifferently well recovered in the Fall, do fall back again in the winter before the Cure be perfectly finiſhed: and as this would be a great benefit to many weak perſons, ſo it would be no harm to this City, if it may be a means of procuring more reſort hither in the Winter time, or more early in the Spring, or more late at the Fall.

I deſire not novelties, or to bring in innovations, but I propound theſe things upon good grounds and examples of the beſt Baths in *Europe*, and ſo I deſire to have them conſidered of, referring both this point, and whatſoever elſe I have ſaid in this Diſcourſe, to the cenſure of thoſe who are able to judge.

I do purpoſely omit many things about the virtues and uſes of our Baths, which belong properly to the Phyſitian, and cannot well be intimated to the patient without dangerous miſtaking. For as *Galen* ſaith, our Art of Phyſick goes upon two legs, Reaſon and Experience; and if either of theſe be defective, our Phyſick muſt needs be lame. Experience was firſt in order:

De compoſ. med. ſ. locos l. 8. *c.* 7.

Per varios uſus artem experientia fecit,
Exemplo monſtrante viam.
From much Experience, th'Art of Phyſick came,
Directed by Example to the ſame.

Reaſon followed, which without Experience, makes a meer contemplative and theorical Phyſitian. Experience without Reaſon, makes a meer Emperick, no better than a Nurſe or an attendant upon ſick perſons, who is not able out of all the experience he hath, to gather rules for the cure of others. Wherefore they muſt be both joyned together: and therefore I refer Phyſitians works unto Phyſitians themſelves.

FINIS.

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Nunc Te n
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London ;

AN APPENDIX CONCERNING BATHE:

Wherein The
ANTIQUITY
Both of The
Bathes & City
Is more fully diſcours'd; with
a brief account of the Nature and Virtues of
the HOT WATERS there.

By *THO. GUIDOTT*, M. B. Practiſing at *BATH*.

Μὴ ἐν πολλοῖς ὀλίγα λέγε, ἀλλ' ἐν ὀλίγοις πολλά.

Pythag. apud Stob. Serm. 34.

Nunc Te marmoreum *pro tempore fecimus : at Tu,*
Si fœtura gregem ſuppleverit, aureus *eſto.* Virg. *Ecl.* 7.

London; Printed by *J. Streater* for *Geo. Sawbridge* living
on *Clerken-well-green*, 1669.

TO MY

HONOURED

AND

Learned Friend,

JOHN MAPLETT,

Doctor in

PHYSICK.

SIR,

Having had the happineſs in a ſtrange place to light on ſo good an acquaintance as your ſelf (whoſe Sober, Candid, and unpaſſionate temper receives an Additional to its native luſtre from the perfunctory, diſobliging, and illiterate Genius of others:) I could not but take the firſt opportunity to teſtifie my Reſpects; and the rather, becauſe *having fallen on a Subject in which you may claim ſome right; I thought it not ſafe to enter your ground without your leave.*

Beſides, we are told by Solinus (*whoſe Aſſertion admits a further probability from the Epithetes of* Παιωνία, Λαοσσόος, Ὑγίεια, Σώτειρα, *&c. given her by* Pauſanias, Plutarch, Ariſtides, *mentioned alſo in* Heſychius, Suidas, Harpocration, *and others, of which I have* elſewhere more largely treated in another Language*) *that* Minerva *was formerly the Patroneſs of theſe Baths; and what fitter perſon could I find out to addreſs this brief Diſcourſe of Baths unto, than him.*

* *In Hiſtoria Æſculapii,* ἀνεκδότα.

——Tritonia *Pallas,*
Quem docuit, multaq; inſignem reddidit arte.

I have joyntly diſcours'd of the Baths and City, which ſeem to me to reſemble the two parts of a Compoſitum, Body and Soul: And as there is a more than ordinary reſpect due to the body, on the account of its being the Caſe and Cabinet of that pearl of great price, our more noble and diviner part, the Soul; So I thought it my Concern to make ſome reflections on the City alſo, as well as the Waters, *by which I think it doth in ſome meaſure appear, that it cannot juſtly be ſaid of the Baths, what was once of the Wit of* Galba *the Roman Emperour lodg'd in a deform'd body, that they have a bad habitation.*

Ingenium Galbæ male habitat ./

If I have not here drawn the Baths to the life, it may be conſidered that it was intended only for a rough draught, and (what is more) that I had not your Penſil. The thing it ſelf, as to the Compoſure of it, is the haſty product of leſs than 14 daies, and thoſe too in the middeſt of, and ſtollen from my other Employments; what therefore is wanting now, I hope ereafter to ſupply.

In the mean, [redacted] *, Sir, I humbly offer to our kind acceptance this ſmall acknowledgement of my real reſpects, as to one whoſe high-r ſeaſon with Academical Studies, together vith the helps and advantages of Travel, ath made a Pillar of your faculty, which your ourteous diſpoſition and civil Deportment, ath ſo neatly poliſh'd that you ſeem to have ttain'd, if we believe the Poet, the utmoſt erfection, having in you that which doth at nce, both delight and profit.*

Omne tulit punctum, qui miſcuit utile dulci. Hor. de Art. Poet.

As for thoſe that are meer husks and out-des of Phyſitians, that deſire to be thought to what they are not, and are nothing leſs han what they ſeem to be; whoſe empty heads *ſerve for no other uſe than Rattles, only to make a pretty noiſe to pleaſe Children, whoſe mouths alſo are open Sepulchres, and they themſelves little better than painted ones.*

Non tali auxilio, nec defenſoribus
iſtis, &c.

We may well ſpare, or rather not ſpare them, as being not the true Sons, but the By-blows of Æſculapius.

Sir, I beg your pardon for giving you this trouble, and aſſure you, That

I Am

Your very Affectionate Friend,
and Humble Servant,

THOMAS GUIDOTT

Bath, Oct. 24.
1668.

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I Shall not here Treat of the Antiquity and Nature of Baths in general, nor put you in mind of the Pool of *Betheſda,* or River of

Jordan, but intending a brief Diſcourſe concerning *Bath*, both as to the City, and Hot waters there, Shall, without any further preface, begin with the Waters, afterwards proceed to the Antiquities of the City; and laſt of all, give a taſte of the Nature and Virtues of the Baths.

That the Baths, or Hot waters of *Bath* in *Somerſet-ſhire*, are of great Antiquity, cannot be doubted by any one who hath in the leaſt caſt an eye on antient Records. Many are the Opinions and Conjectures about the time of their diſcovery, which I ſhall as briefly as I may examine. And becauſe there is very frequent mention made of King *Bladud*, and the Prophet *Elias*, the one as the Founder, the other as being diſcovered in his time: I think it may be for the ſatisfaction of ſome, if I give a particular account who this *Bladud* was, and upon what ſcore the Prophet came to be concern'd in this buſineſs. The ſubſtance of which I take out of a Latine Manuſcript intituled *Brutus Abbreviatus*, being an Epitome of a larger Hiſtory, not concerning my ſelf much in the truth of the Relation, but leaving it to the judgements of thoſe that ſhall peruſe it, to determine of it as they ſhall think fit.

G. M.

My riſe I muſt take from *Brutus*, who after the deſtruction of *Troy*, is ſaid to have come into this Iſland, then called *Albion*, about the year before our Saviours Nativity 1100. where finding none but Gigantick Inhabitants poſſeſſing the Hills, and ſeeing a fruitful ſoil, and full of delights, was pleaſed one day to call his Company together to offer a ſolemn Sacrifice to *Diana*, by whoſe guidance and direction he had lighted on ſo pleaſant an Iſland. But as they were all at Meat, thirty mighty Giants came down upon them, and in a ſhort time ſlew as many of *Brutus* his men, yet were all afterwards quell'd by *Brutus* and the ſurviving Company, except one that was greater than the reſt, whoſe name was *Gogmagog*.

Now *Brutus* had a Companion related to him called *Corineus*, who being not only like *Saul* from the ſhoulders upwards, but from the waſte higher than his Brethren, was deſigned to undertake *Gogmagog*, in which Combat *Gogmagog* brake two of *Corineus* his ribs, who notwithſtanding graſping the Giant in his arms, wafted him along the Sea-ſide, and threw him down a precipice, where he was daſhed in pieces, whence that place now bears the name of *Gogmagog*'s leap.

Nephew, as ſome write.

Suppoſed to be the fall of *Dover* by ſome; by others, the *Haw* at *Plimmouth*.

On this *Corineus*, *Brutus* beſtowed the adjacent Countrey, which he after his own name, called *Cornwall*. For the firſt arrival of *Brute* was at *Totneſs* in *Devonſhire*, ſo named *quaſi Tout en eaſe*, i. e. *Totus in quiete*, from the great delight and recreations that place afforded. Afterwards, finding a more fruitful and noble place on the Thames, built there a City 390 years before that of *Rome*, which he called the City of *New Troy*, in memory of that *Troy* whence he and his progeny came: and having reigned here 20 years, he dyed, and was honourably buried at *New Troy*, or *Troia Nova*, now *London*.

Brutus had three Sons, *Loegrius* or *Locrinus*, *Albanactus*, and *Camber*, between whom he parted this Iſland, *viz.* the Northern part, to wit, *Scotland*, he gave to *Albanactus*; the Southern part *Wales*, to *Camber*; and **England* to *Loegrius.*

* Called therefore by the Welch, *Loygar*, & *Logiers.*

After ſome time, **Humbardus* King of *Humlandia*, came into *Scotland* with a great Army, and ſlew *Albanactus*; which his two Brethren, *Locrinus* and *Camber* hearing of, came with a conſiderable force to find him out, and coming upon him whilſt he was making merry, put him ſo to it, that having no way to eſcape, he drowned himſelf in the River *Humber*, to which he gave name.

* Called by other Writers, *Hunys* or *Hunnys*, King of *Hunc[illegible]*, or *Scythia*, receiving the name of *Humber* or *Humbardus*, after his comeing into *Scotland.*

**Humbardus* had a daughter called *Eſtrilda*, whom *Locrinus* having taken captive in a ſhip, had a mind to make his wife, although he was before married to **Gwenthlea* daughter to *Corineus*, which accordingly he did, and left *Gwenthlea*. *Gwenthlea* being thus repudiated, returned into *Cornwall*, and as Heireſs to her Fathers right, took poſſeſſion of all the places there, and received homage from the Inhabitants; and raiſing an Army in her own defence, made war upon her Husband *Locrinus*, cut off him with his Army, and took Priſoners *Eſtrilda* and her daughter **Avana*; and drowning them in the River *Severn*, cauſed her ſelf to be crowned Queen. She had one Son by *Locrinus*, named *Mahan*, whom when he was of age, ſhe made King, her ſelf retiring into *Cornwall*, died there, and was interred with great pomp and magnificence.

* Others write ſhe was daughter to a King of *Almaine*, and brought with two others thence by *Humbardus.*

**Alias Gwendoloena.*

*Otherwiſe called *Habren.*

**Mahan*, the Son of *Locrinus* and *Gwenthlea*, had two Sons, *Memprice* and *Manlinus*, who fell out about the Crown. *Manlinus* treacherouſly ſlaying

**Alias Madan*, & *Madian.*

ſlaying his* elder Brother *Memprice*, aſpired to the Throne, a wicked and lewd man, who ſharing with *Cain* in the ſin of murdering his Brother, partook alſo with him in his puniſhment, in being a Vagabond, dying wandring too and fro in the Woods and Deſerts.

*Some make *Memprice* to have ſlain his younger brother *Manlinus* (as he is ſometimes called) and *Ebranc* to be the Son of *Memprice*.

Ebranc the Son of *Manlinus* ſucceeded his Father, and with great rejoycings was Crowned King, a prudent and valiant man, who conquered **France*, and with treaſure brought thence, built the City *Eboracus* or *York*, bearing his own name*: He built alſo the Caſtle called *Maiden-Caſtle*, now *Edenburgh*. By ſeveral* Wives he had 23 Sons, all ſtout and war-like Lords, and his Daughters ſtately Ladies: He reigned 60 years.

*Or part of *Germany*, as others.

**Caer Ebranc*.

*Others write he had 20 Wives, of which he begat 20 Sons, and 30 daughters.

After the death of *Ebranc*, the Government of the Kingdom was devolved on his Son* *Bentgreveſtheld*, a wiſe man and good Souldier, who built the Town *Carlyle*, where after he had reigned 20 years, he was buried. In his time *Solomon* governed in *Jeruſalem*, to whom came the Queen of *Sheba*, *Sibilla* by name, to underſtand his wiſdome, and thoſe things that were ſpoken of him.

**Alias Brut-greveſhield*, and *Brutegrenſhield*.

**Ludhudebras* after the deceaſe of his Father *Bentgreveſtheld*, built the City of *Canterbury* and *Winchester*, and was buried at *Winton*.

**Alias Lud, Ludhurdebras, Rudibras*: He is ſaid by others to be the Son of *Leill*.

**Bladut* the Son of *Ludhudebras* was next in Succeſſion, a great Necromancer, who as 'tis ſaid in his Acts, made the Hot Waters in *Bath* by the Art of Magick. But this is rather to be aſcrib'd to Nature, ſince there are Baths in other places hotter than theſe: But I have read, that when

*Called ſometimes *Bladud* and *Baldud*.

when the Prophet *Elias* deſired it might rain, then three Springs of Hot Water aroſe in that City, uſeful for the Cure of Diſeaſes of men. He had a ſon named *Leir*, who built *Leyceſter*. Thus far the Author of the Manuſcript Epitome, whoſe rougher Latine Phraſe, I have ſmoothed what I could, by a Paraphraſtical Verſion.

From what hath been delivered may be collected that *Bladut* (or *Bladud* as he is commonly called) was the eighth King of the *Britains* from *Brute*, and that his line was thus. *Brute*, *Locrinus*, *Mahan*, *Maplinus*, *Ebranc*, *Bentgreveſheld*, *Ludhudebras*, *Bladut*. Now *Brute* being ſaid to have come hither 1100 years before Chriſt, allowing to the ſeven preceding Kings (of which ſome Reigned more, ſome leſs) thirty years a piece for their Reign, one with another, it follows that *Bladud* lived near 900 years before Chriſt was born. He is ſometimes called *Blæydin Cloyth*, that is *Blæydin* the Magician.

As to the Prophet *Elias*, the time when he deſired rain, falls out to be according to computation, in the year of the world 3040. nine hundred, and ſome odd years before Chriſt; ſo that this Prophet and King *Bladud* were Contemporaries, and the antiquity reaches no higher on the account of the later opinion then the firſt.

And this is the higheſt pitch of Antiquity I find aſſigned to the Bathes; as for the Periods aſſerted by others, they come much ſhort of both the former; ſome aſcribing their invention to *Julius Cæſar*, fifty years, or thereabouts, before Chriſt, which the learned Antiquarian, † Mr. *Cambden*, thinks not ſo probable, because *Solinus*

Gul. Malmſb.

† Br. p. 234.

nus, who lived in the time of *Titus Veſpaſian*, 130 years after, or 83 years after Chriſt, was the firſt of the *Romans* that made mention of them.

To which may be added, that perhaps *Julius Cæſar* came not ſo far up into the Land. For whatever ſome flattering Poets and Hiſtorians may fawningly deliver; certain it is that *Julius Cæſar* made not ſo great a Conqueſt here, as ſome do imagine. Whence *Tacitus* writes, that he diſcovered only, not delivered unto the *Romans*, *Britain*. His words in the Life of *Julius Agricola*, are theſe: *Primus omnium D. Julius cum exercitu Britanniam ingreſſus, quanquam proſpera pugna terrnerit incolas, ac littore potitus ſit, poteſt videri oſtendiſſe poſteris, non tradidiſſe*, *Horace* alſo calls the *Britan* before *Auguſtus*, *untouch't*. And Mr. *Cambden* ſaith, that it is ſo far off from being true, which *Paterculus* reports, *bis penetrata Britannia à Cæſare*, that *Cæſar* paſſed twice through *Britain*, that he ſcarce made entry into it. For many years after this entrance of *Cæſar*, this Iſland was left to the free Government of their own Kings, and uſed their own Laws.

Epod. 7.

Br. p. 38.

The *Saxon* Names of *Bathanceſter*, *Hat Bathan*, and *Akmancheſter*, are of later date, the *Saxons* not arriving here till the time of *Theodoſius* the younger, about the year of Chriſt, according to the moſt probable Computation of Venerable *Bede*, 428. Nay, the later name of *Akmancheſter* was not given till ſome few years after the year of Chriſt 577, when from a mean Condition, to which this City was then reduc'd by War, it again recovered ſtrength and great dignity,

‡ Cambden Br. p. 234.

dignity, and from the great concourſe of diſeaſed people, that came for Cure, was called *Akmancheſter*, that is, The City of Sickly Folks.

Neither can their Antiquity be much advanced by the ὕδατα θερμά, or Hot waters, in *Ptolomy*; *Aquæ Solis*, or Waters of the Sun of *Antonine*; or *Badiza* of *Stephanus*, (names more recent then the former) but that which ſeems to come the neareſt to the forementioned Opinion of *Bladud* and *Elias*, is the Britiſh names of *Yr Ennaint*, *Caer Badon*, and above all *Caer Paladdur*, that is the City of *Pallas*, or *Minerva's* Water; eſpecially ſince *Solinus* affirms *Minerva* to have been the Patroneſs of theſe Bathes, of which no doubt, he writes in theſe words, *In* Britain *there are Hot Springs very curiouſly adorned, and kept for mens uſe, the* † *Patroneſs of which is the Goddeſs* Minerva *There being alſo a tradition that there was formerly a Temple dedicated to* Minerva, *where now the Church of* St. Peter *and* Paul, *commonly called the Abbey Church, ſtands.*

† This is alſo mentioned by *Bale, de ſcript. Aug.* in his account of *Bladud. vid. infra* Cap. 5.

Iones Bathes *Aide p. 2. b.*

I have read alſo in an Author that wrote of theſe Bathes almoſt 100 years ago; and the firſt that wrote any thing conſiderable concerning them (Dr. *Turner*, in his Diſcourſe of the *Engliſh*, *German*, and *Italian* Bathes, making little better then a bare mention of them) That the chief Spring of *Bathe* was in the Church-yard then dedicated to *Minerva*, and after conſtituted [illegible] the Abbey of the Monks of the Order of St. *Benedict*. Erected firſt by *Blæidin Cloyeth*, or *Bladudus Magus* that wiſe Magician, a *Britain*, the ninth King after *Brute*, about the year

Bede. Baſil. Bale.

of the world, according to the Scripture account 3080 before the Incarnation of Chriſt † 890. *Heliſæus* Prophet then in Iſrael,

† Others, 863.

But although I have ſome reaſon to diſtruſt this Genealogie of *Bladud*, which he, acccording to the Cuſtome of his Countrey, drives as high as may be, even unto *Adam*, making *Bladud* the thirtieth man, in a direct line from him; yet I cannot but in ſome meaſure, commend his Chronologie, as being not much different from the account given before. And whereas he affirms *Bladud* to have been the nineth King from *Brute*; I find, by comparing other Hiſtories, that *Leill* (if the ſame with him whom the Author of *Brutus Abreviatus* calleth *Leyr*) was not Son to *Bentgreveſheld*, but great Grand-child, being Son to *Bladud*, his, that is *Bentgreveſheld's* Grand-childs Son: and ſo *Leill*, whom he maketh Father to *Ludhudebras*, not to come in before, but after *Bladud*, as being his Son, and he the ninth King from *Brute*, and not his Father. Yet on the other hand, I muſt ſay thus much, that the name *Carlyle*, a City ſaid by the Author I follow, to be built by *Bentgreveſheld*, diſſonant from the cuſtome of thoſe times, wherein the Founders uſually called places after their own names, and many of thoſe eſpecially to which they added *Caer*, doth ſomewhat incline me to think there might have been one *Leill*, Son to *Bentgreveſheld*, as ſome Hiſtorians mention, and Founder of that place aſcribed to his Father. However, the matter is not great whether *Bladud* was the eighth King from *Brute*, as my Author ſuppoſes, or the ninth, or tenth, as others; I inferring

By *Bale* he is ſaid to be the tenth King of the *Britains*.

inferring no more from the preceding Hiſtory then this, That *Bladud* lived near 900 years before Chriſt; ſince of the exact time of his flouriſhing, more then by Conjecture, by reaſon of the Confuſion and Diſagreement among Hiſtorians touching the Number, and Succeſſion of the Kings, and time of their Reign, we have no certain account,

But to be as particular as I may, becauſe ſome years paſſed between the Birth of thoſe ſeven Kings mentioned before, and the begining of their Reigns, and alſo becauſe *Gwenthlea*, or *Gwendoloena*, and *Leill*, are ſaid by other Hiſtorians to have Reigned 40 years (*viz.* the former 15, the later 25) which are not there accounted for, the ſurer way will be to take our account from the Year of the World. Now *Brute* being reported to have entred *Albion A. M.* 2855, and *Bladud* to have begun his Reign *A.M.* 3100, the difference between theſe two numbers is 245 which being taken out of 1108 (the year before Chriſt, in which *Brute* came hither, anſwering to the Year of the World 2855) the Remainder will be 863 (the Year before Chriſt, anſwering to the Year of the World 3100) ſo that according to this Computation, *Bladud* began his Reign over the *Britains*, juſt 863 years before Chriſt was born, and Reigning 20 years, died in the Year *Ante Chriſtum*, 843. I know *Fabian* the Author of *Polychronicon*, and others, differ ſomewhat in their Chronologie concerning *Bladud* from that I have given, but I look on this to be as probable as any.

Alexander Necham, a Poet of our own, ſomewhat

what above 400 years ago (with whom, as to the Antiquity of the Bathes, Dr. *Jorden* contents himſelf) wrote theſe Verſes on the Bathes. *Cap.* 17.

Bathoniæ Thermis vix præfero Virgilianas,
Confecto proſunt Balnea noſtra ſeni,
Proſunt Attritis, Colliſis, Invalidiſque,
Et quorum morbis frigida cauſa ſubeſt.
Prævenit humanum ſtabilis natura laborem,
Servit naturæ legibus artis opus.
Igne ſuo ſuccenſa quibus data Balnea fervent
Ænea ſubter aquas vaſa latere putant.
Errorem figmenta ſolent inducere paſſim.
Sed quid? Sulphureum novimus eſſe locum.

Which I thus made Engliſh;

Bathes Bains with *Virgils* I compare,
Uſefull for antient folk they are;
Bruis'd, weak, conſum'd, as well as old.
And in al griefs whoſe ſource is cold.
Nature mans labour doth prevent
And art again ſerves her intent.
There's fire under-ground, ſome ſay,
That thus makes Bathes great pots to play.
Fancy doth often Error breed.
But what? from Brimſtone theſe proceed.

CHAP. II.

Of the Antiquity of the City of *Bath*, and things relating thereunto.

Bathe *called firſt* Caer Blæidin, *afterwards* Caer Bathe. *When inhabited.* Coill *and* Edgar (*whoſe Statues ſtand at the end of the Council-houſe*) *who, and when they flouriſhed.* Bathe *beſieged by the* Saxons; *relieved by King* Arthur. Offa's *Church. Difference between the Mayor and Covent. Hoſpitals. Free-School. The Author of the Hiſtory of the* Worthies *of* England *cenſured, and ſome of his miſtakes diſcovered.*

IT is not I think, to be doubted, but that the Bathes were before the City, and gave Name to it: Sick people, in all probability that came hither for relief, firſt making ſmall Cottages for their Conveniences, which were afterwards improved into fairer Buildings. So that now in this particular, there are few places in *England* that exceed it.

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That this place was built, or rather begun, by King *Bladud*, is the opinion of ſome, and that he called it by his own Name *Caer Blæidin*, which ſometime after came to be *Caer Bathe*. That it was inhabited in the time of the *Britains*, at leaſt 50 years before Chriſt, appears from the names they gave it of *Caer Badon*, and *Caer Palladdur* (of which before) unleſs it be ſaid that theſe Names might be given by ſome *Britains*, in the *Romans*,

Mat. Weſtm.

Romans or Saxons time,which ſeems not to carry any great probability. Nay, I find it recorded, that in the year *ante Chriſtum* 684. *Siſillus*, or, after ſome Writers, *Sylvius* Brother of *Gurguſtus*, was made Ruler over *Britain*, and reigning 49 years, was buried at *Caer Badon*, or *Bath*. However, many Roman Monuments there are, Inſcriptions and Images in the City walls, and elſewhere, (of which Chap. 4. gives a particular Account) which evidently prove its being frequented before the 412 year of Chriſts Incarnation, about which time (or as others account, 430) the Roman Juriſdiction ceaſed in this Iſland.

Engl. Chron.

Lanquet.

The Statues alſo of *Coill* a Britiſh King, and *Edgar* a Saxon (who are ſaid to have given Charters to this City) placed at the end of the Town-Hall, or Council-Houſe, are Arguments of its Antiquity.

Coill (that I may ſpeak ſomewhat briefly of him) was an Earl in the time of **Aſclepiades* (whom the *Britains* after the death of *Lucius*, being wearied out with a bloody inteſtine War, which laſted more than 50 years, were at laſt conſtrained to elect their King) about the year of Our Lord*250. Afterwards aſpiring to be greater, and building a Town which from himſelf he called *Colcheſter**; *Aſclepiades* began to fear him, and raiſing an Army, met him in the field, in which Battle, *Aſclepiades* was ſlain, and ſhortly after *Coill* choſen King, who governed the Britains with a great deal of honour; and having married his Daughter *Helena* to *Conſtantius*, ſent from *Rome* into *Britain* to demand Tribute, not

Aut. Br. Ab. Ms.

**Alias Aſclepiodatus.*

*Others 256.

**Britannice Caercolyn.*

not long after dyed, and was buried at *Colcheſter*: yet ſome there are who aſcribe the building of this Town to *Coilus*, Son of *Marius*, and Father of *Lucius*, King of the Britains, *A. D.* 126.

Edgar, one of the later Kings of the Saxons, beſtowed on this City (as Mr. *Cambden* reports) very many Immunities, the memory of which thing, even in his time, the Citizens yearly with ſolemn playes, did celebrate. He was a ſtout man, and is ſaid to have had none like him on this ſide *Arthur*, bearing this ſtile about the year 970. *The Monarch of all Albion*; Or, as it is elſewhere more largely expreſs'd, *King of Engliſh-men, and of all the Kings of the Iſlands of the Britiſh Ocean, and all the Nations contained in* Britain, *Emperour and Lord.* A Souldier he was in the*Camp of *Cupid* as well as *Mars*, and is noted for this, That having a mind to *Eſtrilda* the Wife of *Athelwold*, he placed him (as *David* did *Uriah*) in the front of a Battel againſt the Danes, in the defence of *York*; where *Athelwold* being ſlain, *Edgar* married his Widdow, but was ſo ſeverely check'd by Saint *Dunſtane*, that he ever after lived a religious life; and having reigned 17 years, bid adieu to the World, and was buried at *Glaſtonbury*. *Edgar* began his reign about the year of Chriſt 959. but was not Crowned till 12 years after, *A. D.** 971, which was done, according to ſome writers, at *Bath*, to others at *Kingſton* by *Dunſtan* Arch-Biſhop of *Canterbury* (who, ſome ſay, was baniſhed at that time) and *Oſwald* Arch-Biſhop of *York*: his Coronation was deferred, becauſe of his impetuous inclinations to the female Sex; and

Br. p. 234.

Anglorum Baſileus omniumq; Regum Inſularum oceani quæ Britanniam circumjacent, cunctarumq; Nationum, quæ infra eam includuntur Imperator & Dominus. Henr. Spelm. *Conc. Tom.* 1. *p.* 432. & Seldenus *in Mar. Clauſ.*

* *Militat omnis amans, & habet ſua caſtra Cupido.* Ovid.

* *An.* 973. Mat. Weſtm.

and eſpecially to one *Wilfride*, who to avoid the Kings Careſſes, took on her the habit of a Nun, but in vain, for he had his pleaſure, and got on her a daughter named *Edith*; for which offence he was enjoyned ſeven years penance, and lived not long after his Coronation.

Cambden ubi ſupra.

About the year 472, or 44 years after their arrival here out of *Germany*, the Engliſh Saxons beſieged this City, with whom King *Arthur* fought a great Battel on *Mons Badonicus*, now called *Banneſdowne*, and ſlew ſo many of them, that they had little heart to make any further attempt for a conſiderable time, but left it to the quiet poſſeſſion of the Britains. *Ninnius* writeth, that the 12 of King *Arthur*'s Battels againſt the Saxons, was at the Hill or Town of *Bath*, where many a one was ſlain by his force and might. *Bath* was alſo in the time of King *Arthur*, by whom it was relieved, beſieged by *Cheldericus* King of *Almain*. The ſtory as mine Author relates it, was thus; *Eodem tempore venit Chedericus*, &c. At the ſame time (ſpeaking of the reign of King *Arthur*) came *Chedericus* a valiant King out of *Almaine*, and landed in *Scotland* with 500 Ships: *Arthur* hearing of this at the ſiege of *Colegrin* near *York*, left the ſiege, and coming to *London*, ſent letters into *Britain* the leſs, to King *Hoel* his Siſters Son; who in a ſhort time came into *England* with a great Army, and was met by *Arthur* at *Wincheſter*, with great rejoycings. Theſe two going both to *Nottingham* (which *Cheldericus* had beſieged, but not taken) *Arthur* came upon him unawares, and made a great ſlaughter among his men; *Chelde-*

Yet N.

Aut. Br. Abb. Mſ.

ricus himſelf fled into a wood, where *Arthur* finding him, he ſwore, that if he and his Souldiers were permitted to depart, he would never more for the future trouble his Kingdom: *Arthur* condeſcended hereto, but the wind proving croſs when they were on the Sea, they came back again, and landing at *Totneſs*, did a great deal of miſchief, deſtroying the Countrey as far as *Bath*. They of *Bath* ſhutting their Gates, made a ſtout reſiſtance: but when this was known to *Arthur* then in the *Marches* of *Scotland*, he came to the relief of *Bath*, fought with *Cheidericus*, and diſcomfited his Army, &c. yet in the year 577. on a long ſiege, and ſtrong battery by the Saxons, it yielded, but afterwards grew into great repute, and got a new name, viz. *Akmancheſter*.

Not long after the year 552. *Ceaulmus* King of the Weſt Saxons fought with the Britains, and took from them the Cities of *Bath*, *Glouceſter* and *Worceſter*.

Cambden. Br. p. 234.

A. D. 676. *Oſbrich* founded here a Nunnery, and not long after, *Offa* King of *Mercia* built a Church, both which in the time of the Daniſh Wars were demoliſh'd; out of the ruines of thoſe two aroſe the Church of Saint *Peter*, in which *Edgar* was Crowned (as is mentioned before) but of the Church, more in its place. This *Offa* was Brother to *Oſwald*, ſurnamed *Chriſtianiſſimus*, and is ſaid to have ſpent much of his time at *Bath*. *Offa* (ſaith the Author of *Brutus abbreviatus*) *frater Oſwaldi*; *Iſte Offa, multùm morabatur Bathoniæ.*

Concerning his ſuppoſed Tomb, and place of burial, ſee Chap. 4.

Domeſday-Book.

In the time of *Edward* the Confeſſor, *Bath* flouriſhed exceedingly, the King having there

64 Burgers, and 30 Burgers of others; the City paying tribute according to 20 Hides, which amounts to about 80 yard land.

In the reign of *William Rufus*, *Robert Mowbray*, Nephew to the Biſhop of *Conſtance*, ſack'd and burnt it.

Cambden. Br. p. 234.

The Induſtrious Mr. *Prynne* (to whom I am obliged for ſome marginal Remarks) in his *Brevia Parliamentaria Rediviva*, and fourth part of a brief Regiſter of Parliamentary Writs, hath given an account of Citizens returned to ſerve in Parliament for this City, ever ſince the *26 th.* year of King *Ed.* 1. about *A. D.* 1298.

p: 298.

p. 299.

It is alſo recorded, that in the year 1418. in the time of *H.* 5. there aroſe a conteſt between the religious perſons, *John Telyford* Prior, with his Covent, and the Mayor about ringing of the Bells, which laſted ſome years, but was afterwards compoſed, and brought to a good iſſue.

Libell. Rub. de Bath. Ms.

In *Bath* are three Hoſpitals (it ſelf, indeed, being but one great one) St. *Johns*, *Bellots*, and the *Bimburies*, ſometimes called St. *Katherines*; beſides a Free-ſchool erected, (as by the Inſcription over the door it appears) in the time of King *Ed.* 6.

The Hoſpital of St. *Johns* was founded *A. D.* 1174. by *Reginald fitz Joceline*, a Lumbard, Biſhop of *Bath* and *Wells*, and afterwards tranſlated to *Canterbury*, but before he was poſſeſſed of his new honour died, and was buried at *Bath*. It was valued at the yearly Rent of 22 *l.* 19 *s.* 6 *d.* ſince which time its Revenues are much encreaſed; he gave it this name, as I ſuppoſe, from St. *Johns* in the *Savoy*, where he was conſecrated

Godw. Cat. p. 364.

Biſhop after his return from beyond Sea, by *Richard* Arch-Biſhop of *Canterbury*.

Where, by the way, I cannot but take notice that this Hoſpital is ſaid to be built by *Joceline* of *Wells*, and *Hugo* Biſhop of *Lincolne* in the late Account of the Worthies of *England*. In which *Hiſtory* (beſides the Confuſion of *Joceline de Wells*, with *Reginald fitz Joceline*) *the Author* is guilty (that I may ſay no worſe) of many miſtakes: To give an inſtance or two inſtead of a larger Catalogue that might be produc'd; he affirms, that *Joceline* of *Wells* was the firſt man that fixed on the title of Biſhop of *Bath* and *Wells*, and tranſmitted it to all his Succeſſors, when 'tis manifeſt out of *Biſhop Godwins Catalogue* of Biſhops, that *Robert* Biſhop of *Wells* was the man, the 18*th*. Biſhop of that *See*, and not *Joceline* who was the 21.

p. 363. He writes alſo, (which is a thing I confeſs of no great moment, but yet a miſtake) that the famous Dr. *Harvey* was never married, when his Wife is mentioned by himſelf. And to inſtance in no more now (becauſe I would not digreſs too far) he avers the ſame perſon, though living a Batchellor, to have left behind him three Children, which he calls his three Books, *viz.* *De Sanguinis Circuitu*, *De Generatione*, & *De Ovo*; whereas the Doctor that ever I could find (who poſſibly have made as diligent a ſearch after the writings of that modeſt, ingenious, and (however the ignorance and envy of ſome have endeavoured to traduce him) learned Phyſitian, (whoſe memory I deſervedly reſpect and honour) as any other can, I ſay Dr. *Harvey* (that

De Gen. An. Exerc. 5. p.m. 60.

ever I could underſtand) never printed any thing beſides his Treatiſe of the Circulation of the Blood, and his Exercitations concerning the Generation of Animals, the *Hiſtorian* making two Books of *De Generatione, & de Ovo*, when indeed they are but one.

I acknowledge he mentions many things intended for the publick; as 1. Exercitations about Reſpiration of Animals. 2. A Treatiſe of the Love, luſt, and gendring of living Creatures. 3. Of Nutrition. 4. Medicinal Obſervations. 5. Phyſiologia, with ſome others, wherein no doubt that excellent Perſon had made many rare and conſiderable diſcoveries, which we are not ſo happy now to enjoy; but that any thing elſe, ſave the two forementioned Treatiſes, was permitted, or any other Book *De Ovo*, compoſed by Dr. *Harvey*, beſides that *De Generatione Animalium* (wherein he ingeniouſly obſerves the *Primordium*, or firſt beginning of all living Creatures to be either an egg, or ſomething Analogical to it.) I ſhould be very glad to be informed.

Bellots Hoſpital was built by *Thomas Bellot* Eſquire, one of the Executors of the Lord *Cecill*, in the time of King *James*, of whom we ſhall ſpeak more largely in the next Chapter of the Church, to which he was a great Benefactor.

As for the Bimburies, I can learn no more concerning it, than this, that it was built by ſeven Siſters, who left this Hoſpital behind them, as a Monument to Poſterity, both of their Charity and Name.

CHAP. III.

Of the Church of Saint *Peter* and *Paul*.

An account of the Church of St. Peter *and* Paul, *in* Bathe, *from the firſt foundation to the time it was finiſhed. A Latin Poem on the ſame Subject, written to Biſhop* Mountague , *with the Anſwer of the Biſhop.*

THE Church of St. *Peter* and *Paul* , commonly called the Abbey Church, as now it is, is a neat, and curious Fabrick ; of which, that I may give ſome account, from its Original, many Periods , and great alterations it hath undergone, as far forth as my Obſervation , Information , and what Records I have ſeen will reach : The firſt Church I find mentioned ſince the Temple of *Minerva*, (which ſome place here) was that built by *Offa* King of *Mercia*, and brother to *Oſwald* (of which before)in the year after
775 Chriſt 775. which was afterwards deſtroyed by
1010 the *Danes*, and in the year 1010 , re-edified by *Elphegus* , who being a man of great Parentage, and Prior of *Glaſtonbury*, left that place, and betook himſelf to *Bathe* , where living a very ſtrict and exemplary life, even to admiration , he was choſen Abbot , and in the year 984 Biſhop of *Winchester*, and *A.* 1006 promoted to the Arch-Biſhoprick of *Canterbury*, in which time he new built this Church, four years after his coming to that See. But the Fabrick he erected ſtood not long ; for 77 years after, or *A. D.* 1087. both it,

it, and almoſt the whole City, was conſumed by fire, by *Robert Mowbray*, Nephew to the Biſhop of *Conſtance*, in the firſt year of *William Rufus.*

The next year following, viz. *A.D.* 1088. appeared *John de Villula*, a *French-man*, born at *Tours*, and ſometime Practitioner in Phyſick, or to ſpeak [redacted] plain, an Empirick (ſuch as now almoſt every place doth abound withall, we having juſt cauſe to renew the Complaint made by *Hypocrates* in his time, that there are now adays, Ἰητροὶ φήμῃ μὲν πολλοὶ, ἔργῳ δὲ πάγχυ βαιοί. Many, by a ſort of people, their own Creatures, much admir'd, but what Artiſts they are is eaſy [illegible] to be ſaid) for the Hiſtorian brands him with this Character, that he was *uſu, non literis, medicus probatus*, a man that practiſed more by rote, then any great cunning, and if he chanced at any time to do any good, it was more to be attributed to the ſtrength of Nature, and his good hap, then to any Art in the man, or accountable Virtues in his Medicines. This man however, although not for his reach in Phyſick, was to be commended in this that he had a good liking to the Abbey, and though a poor Phyſitian, was a rich man, and a great Benefactor to the Church, which he building from the ground, and augmenting the Revenues from a ſmall mater to a conſiderable proportion, may ſeem to deſerve the name of the firſt Author, and Founder of it. He lived not to ſee it finiſh'd, being prevented by death, which happened the 29th. of *December*, 1122, and was buried at *Bathe*, in the Church he built.

1088

L. de leg.

Gul. Malmſb.

This *John* was Biſhop of *Wells*, but upon ſome diſlike † removed his Epiſcopal Chair to *Bathe*, and was known by the title of Biſhop of *Bathe*, renouncing that of *Wells*, and bought this City of *William Rufus*, (or, as ſome ſay, *H*. 2.) for 500 Marks, which continued in the Biſhops hands till the 4th. year of *Rich*. 1. about *A. D.* 1192. at which time *Saverick*, firſt Arch-Deacon of *Northampton*, afterwards Biſhop of *Bathe* and *Wells*, a *German*, and Kinſman to the Emperour, in order to the more ſpeedy effecting his deſign of being Biſhop (to the performance of which, among other things, as Conditions of the Kings Releaſe, (being taken Priſoner by *Leopold* Arch-Duke of *Auſtria*) the Emperour had engaged him) returned the Poſſeſſion of the City to King *Richard* the firſt.

† The Charters of *William Rufus* and *H*. 1. for tranſlating his See to *Bathe*, and the manner thereof, may be ſeen in Mr. *Dugdales Monaſt. Angl.* pp. 185, 186.

1137 In the year 1137 *July* 29, 15 years after the death of *John de Villula*, the Church he lately built was conſumed by fire, and re-edified by *Robert*, a Monk of *Lewes*, born in *Normandy*, but by Parentage a *Flemming*, then Biſhop of that See. He not only made good what the fire had deſtroyed, but carried on the work to a greater perfection. In the troubles between *Maud* the Empreſs, and King *Stephen*, he ſuffered a long and cloſe reſtraint at *Bathe*, from the King, and after his enlargement, endeavoured an Accommodation between the two Churches of *Bath* and *Wells*, which had differed many years about the Epiſcopal See, and at laſt, with conſent of both parties, made this agreement, that the Biſhops hereafter ſhould be called Biſhops of *Bathe* and *Wells*; That each of them ſhould by Commiſſion appoint Electors, the See being void, by whoſe voices the Biſhop ſhould be choſen; And that he ſhould be inſtalled with both of theſe Churches. The ſecond of third Articles was not long obſerved, for *A. D.* 1244. in the 29th year of *Hen.* 3. The Monks of *Bathe*, refuſing to joyn with the Chapter of *Wells*, choſe of themſelves one † *Roger* for Biſhop, which occaſioned a long Suit in Law between the two Churches, compoſed afterwards by the Biſhop, who died not long after, and was buried at *Bathe*. The Condition of which Compoſition was this; That they of *Wells* muſt be ſatisfied for the preſent, and they of *Batke* promiſe performance of the Agreement made by *Robert*, for the future, which was done accordingly.

† He was confirmed Biſhop by King *Hen.* 3. his Patent, *ad inſtantiam Domini Papæ, de gratia Regis Speciali, ſalvo jure Regis, & Eccleſiæ* Wellenſis. *P.* 28. *H.* 3. *m.* 6. *intus.*

This Structure erected by *Robert*, continued till the time of *Henry* the 7th; when *Oliver King*, the 23d Biſhop after the Union of *Bathe* and *Wells*, pulling down the old Church built by *Robert*, not *John de Villula* (which was burnt) as Mr. *Cambden* affirms) began the foundation of a fair and ſumptuous Building, but left it, by reaſon of his death, whatever the lately mentioned Hiſtorian relates, very imperfect. For beſides the Coſt beſtowed on it by Cardinal *Hadrian de Caſtallo*, choſen Biſhop *A. D*, 1505. which I think, was not great; *William Bird*, the laſt Prior of the Abbey, undertook it, and partly of himſelf, and partly by the help of others, almoſt brought it to perfection, when in a ſhort time after the diſſolution of Religious Houſes enſuing in the time of *Henry* the eighth, it was again demolliſh'd. In memory of this Prior *Bird*,

Br. p. 234.

Bird, there is in the Chappel, on the South ſide of the Quire, at the Eaſt end, a Coat of Armes in Stone, a Cheveron between three Falcons, their Wings and Members diſplai'd; on a Chief, a Roſe between two pretious Stones, and for a Creſt a Miter and Crozier. And in the out-ſide of the Chappel Wall, Southward, a W. and a Bird.

Neither are there wanting memorials of the Name of the foreſaid *Oliver*. For in the Front of the Church, on both ſides, on a Pillar, are placed two Elephants about an Olive Tree, and an Inſcription engraven in Stone under it, in al- *Judges 9.*
luſion to the parable of *Jotham*, of which this is part,

Trees going to chuſe their King
Said, be to us the Oliver *King*

(Which in the late times cauſed ſome to ſuſpect it for a Propheſie) with a Miter over all. This *Oliver King* was Doctor of Laws, of Kings Colledge in *Cambridge*, Principal Secretary to three Monarchs of this Land, *Edward* the 4th, *Edward* the 5th, and *Henry* the 7th. Regiſter of the Knights of the Garter, Biſhop of *Exeter*, and thence tranſlated hither, *Novemb. 6.* 1495. died *Jan.* 24. 1503. and is thought to lie buried at *Windſor*, where he was ſometime Canon.

The Death of Biſhop *King* obſtructed this D. F.
Structure (as a Reverend Doctor is pleaſed to quibble) ſo that it ſtood a long time neglected, which gave occaſion to one to write on the Church Wall with a Char-coal.

O Church I wail thy woful plight
Whom King, nor Card'nal, Clark, nor Knight
Have yet reſtor'd to antient right.

Alluding herein to Biſhop King, who began it, and his four Succeſſors in 35 years, *viz.* Cardinal *Hadrian* mentioned before, who ſat Biſhop 12 years, and was afterwards deprived of this, and all other promotions, for conſpiring with ſome other Cardinals, the Death of Pope *Leo* the 10th. Cardinal *Wolſey*, who held the Biſhoprick *in Commendam* four years, and was then tranſlated to *Durham.* Biſhop *Clark*, who ſate 19 years, and died in the end of the year 1540, being poyſoned, as was ſuppoſed, in *Germany*, when he went Ambaſſadour to the Duke of *Cleve*, to give a reaſon of the Kings Divorce from the Lady *Anne of Cleve*, his Siſter; and Biſhop *Knight.* Theſe four contributing nothing conſiderable to the finiſhing thereof. Alſo one *Caſſadore*, a popiſhly affected perſon, wrote a Propheſie of this Church, to be ſeen in *Fullers* Worthies, with what he thinks is the meaning of it. *Somerſ. p.* 19.

Upon the diſſolution of the Abbey, the Church was uncovered, the Lead taken away, and the Walls much ruin'd, and ſo continued for ſome time. But ſince its laſt demolition, in the Reign of King *Henry* the 8th, it hath thrice been attempted to be re-edified; Firſt in the time of Queen *Elizabeth*, by a General Collection, by which the Work was not much advanc'd. The Second, in the beginning of the Reign of King *James*, *A. D.* 1604. in whoſe time it met with many Benefactors; the principal whereof to this ſecond work was *Thomas Bellot* Eſquire, Steward of the Houſe, and one of the Executors of the Right Honourable, *William* Lord *Burghley*, ſometime Lord Treaſurer of *England*, who made ſome entrance on this work in the Reign of Queen *Elizabeth*, and laſt of all, about the middle of King *James*'s Reign it was finiſh'd and brought to perfection, as by the Munificence of Noblemen, Knights, Gentlemen, and others, whoſe Names are on Record, ſo eſpecially by the liberal hand of Dr. *James Mountague*, ſometime Biſhop of this Dioceſe, who at one time gave 1000 pounds toward its Reparation, and lies buried in the body of the Church, deceaſed *July* 20.1618.

It appears alſo from the Memorials of the Church, that before the firſt of theſe three laſt attempts to repair it, there was little of the Church ſtanding, ſave the bare Walls, and thoſe too, in many places, much impaired, which being then, as it was, decayed in the hands of *Edmund Colethurſt* Eſquire, was by him beſtowed on the City, though uncovered, and much ruin'd, as it had long ſtood after the diſſolution; and therefore he bears the name of the principal Benefactor to the firſt work.

The particulars of the Reparations, with the Names, and Sums of the Benefactors from the time of Queen *Elizabeth* downwards (which are not for me here diſtinctly to mention) are Recorded in a Book kept for that purpoſe in the Library belonging to the Church, begun by Biſhop Lake, and augmented by ſome others, but yet ſtands in need of the helping hands of more Benefactors.

And although I have ſaid ſo much concerning this Church already, yet I ſhall crave leave to add as a Concluſion to this Matter a Poem, which accidentally came to my hands by the means of Mr. *John Parker*, Citizen of *Bathe*, a lover of Antiquity, and my good Friend (to whom I acknowledge my ſelf engag'd for the aſſiſtance he afforded me in my ſearch after the Antiquities of the the City) found in the Study among other Papers, of that learned Knight, Sir *John Harrington*, whether made by himſelf, as ſome imagine (who well might do it, having a great genius to Poetry, and called by Dr. *Fuller*, one of the moſt ingenious Poets of our Nation) or ſome other, I know not; written, and as it ſeems, ſpoken to Biſhop *Mountague*, at his firſt coming to *Bathe*, and Sight of the Church; which I ſhould have tranſlated, but that the Subſtance of it, as much as is neceſſary to be known for Hiſtory, is contained in the foregoing account. However, to preſerve it from periſhing, and to gratifie the lovers of Antiquity, (to whom I chuſe rather to incur the cenſure of being Prodigal, then any way Nice, in with-holding any thing I think may deſerve their acceptance) I ſhall inſert it here, in Latin, as I found it. The Title thus,

Conditionis

ECCLESIÆ
SANCTI
PETRI & PAULI
Bathonienſis,
A PRIMIS
FUNDAMENTIS,

IActis an. 775.
AD ANNUM DECURRENTEM, 1609.
Hiſtorico-Poetica 'Εξήγησις;
Deq;
Fæliciſſima ejuſdem Eccleſiæ reſtauratione
VATICINIUM.

Ad Reverendiſſimum in Chriſto Patrem, Jacob. *providentia divina, digniſſimum Eccleſiæ* Bathonienſis *&* Wellenſis *Epiſcopum*, Bathoniam *primo fæliciter inviſentem, & viſitantem.*

MActe, bonis avibus; recidivi limina Templi
(In Chriſto reverẽde Pater) gratiſſimus intras.
Macte,

Macte,ſed haud pigeat prius æqua mente parumper
Priſtina delubri perpendere fata miſelli.
Temporis elapſi ſtudio monumenta revolvens **Hiſtoria.**
Attento, invenies hujus fundamina Templi,
Prima *Offam*, priſcum regem, jeciſſe; ſecunda **775.**
Ephegum, regni primatem; Tertia tandem **1010.**
(Cum duo Danorum rabies, igniſq; priora
Vaſtaſſet) ſumptu poſuit majore *Johannes* **1088.**
De Villa, natu Gallus, non infimus artis **Agyrta.**
Profeſſor medicæ, *Wellenſi* ingratior ædi;
Qui, poſtquam variis viguiſſet Epiſcopus annis,
Sedem Thermopolin Cathedralem tranſtulit illinc.
Urbe hac, quingentis Marcis, a Rege coempta,
Pulchrius antiquis fanum conſtruxit: at ipſum
Ævo combuſſit pariter Jovis ira ſequenti.
Structorem celebris miſit Normannia Quartum,
Officio Monachum, *Robertum* nomine, molem **1137.**
Subverſam toties qui reſtauravit; & inter
Presbyteros, litem, de Sedis honore, diremit,
Exornans titulis utramq; æqualibus urbem.
Tandem poſt ſeriem numeroſam, munificamq;
Inſignis præſul pietate, viceſimus atq;
Tertius, hunc ſequitur; qui fauſtum nominis omen,
Expreſſit factis, *Oliver King* dictus, *Olivam* **1495.**
Et *Regem* vere referebat, ad inſtar olivæ
Pacis erat populo, ſimul ubertatis & author.
At magis hoc retulit regalis munere Regem,
Quippe opus incultum *Rodberti* ſuſtulit, atq;
Illius, extemplo vice, fundamenta locavit,
Iſta; dedit ſolidis ſpecioſa pteromata muris.

Tecta ſuperſtruxit ſublimibus alta Columnis,
Areolas ſoleis longas ſubſtravit & amplas,
Omnia ad hanc pulchram ſtructuras cætera formam,
Et fundis, dubio procul, inſtructurus opimus,
Morte immortales ſubito eſt arreptus ad arces.
Tantæ molis erat tam clarum condere Templum!
Ne tamen his tantis perfectio debita cæptis
Deforet, huic operi Colophonem attexuit, almus
Abbatiæ Rector *Gulielmus Birdus*, At eheu!
Sanctis ſtare diu fatis (proh fata!) negatum eſt.
Horrida de innocuis fertur ſententia fanis;
Abbatiæ pereunt, ſpoliantur Templa, rapinis
Tecta patent, reditus, fundi, Sacraria; quid non?
(Unde nefas tantum Zeli fautoribus?) una
Iſte, vel in Cunis, inſons diſcerpitur infans.
Impete diripitur violento hæc fabrica; præſtant
Saxa, vitrum, plumbum, Campanæ, ac omnia præter
Hoc miſerum χελετὸν; Tantæ at quæ Cauſa ruinæ?
Num pietatis amor an amor ſceleratus habendi?
Hic amor exitio eſt Templis, Templiq; miniſtris,
Hic amor extinxit clariſſima lumina regni;
Nec ſinit hic Amor hæc extincta reſumere lucem,
Nemo bonum Templi, Templi bona quiſq; requirit.
Hinc hæc Cimmeriis, per tot, tam turpiter, annos,

Maxima lux urbis, latuit ſuppreſſa tenebris,
Sed pater omnibonus, cui providâ cura Suorum eſt,
Hanc piceam nuper, cæleſti lampade, noctem
Diſpulit e multis Sanctorum cordibus, unde
Accendere ſuo noſtrum de lumine lumen.
Sic tamen, ut quivis magis hinc ſibi luceat ipſi,
Ut tanto ad præſens reliquos veneremur honore,
Vivida quos totum celebravit fama per orbem,
Nobile *Bellotti* ſidus, ſic emicat, omnes
Inter nutritios Templorum jure colendos,
Plena velut ſtellis præfulget Luna minutis.
Singula quæ cernis pulchræ ornamenta Capellæ,
Area, porta, ſolum, Subſellia, Roſtra, feneſtræ,
Bellottum unanimi Compellant ore parentem.
Bellottum ſonitu reboat Campana canoro,
Πτωχοτροφεῖα ſonant Bellottum, Balnea, vici,
Compita, *Bellotti* jactant ad ſidera nomen,
Quod Chriſti eſt cultor ſimul excultorq; ſacrorum.

VATICINIUM.

Deſine plura: ſat eſt veterum, peragenda peractis
Succedant; meliora bonis, majora minutis.
Auſpiciis huc miſſe ſacris (Sanctiſſime Præſul!)
Senſibus hæc imis ſuperum Conſulta repone,
Quæ tibi fatidico diſpandit carmine Vates,
Læta ruinoſo proclamans omnia Templo.
Quo decet, hanc ſpecta, vultu, ſine nube, ſereno,
Fœcundam laudum ſegetem ſine fine Tuarum.

Molliter oſſa Cubant *Offæ*, ac *Elphegi*, *Oliveri*
Rodberti, *ac Birdi*, merito celebrentur honore;
Debita Bellotto reddatur palma benigno:
Per-pius extento Bellottus floreat ævo.
Non equidem invideo, lætor mage, gratulor illi.
Quod ſi tam celebrem mereatur guttula laudem,
Præmia quæ referet largos qui funditat imbres?
Tantum at honorifico cedes, Bellotte, *Jacobo*,
Effuſo tenuis quantum imbris guttula cedit.
Bellotti guttis rorata Capella vireſcit,
Imbribus aſſiduis Divi madefacta *Jacobi*
Integra quam lætos diffundent Templa racemos.
Nec tamen hæc aqueo vitis cupit imbre rigari:
Aureolo hanc Danaem ſaturabis, Jupiter, imbre.
Hinc quæ ſpreta diu languenti Eccleſia morbo
Intabuit; vitam, Te Te medicante reſumit,
Ut redit infuſo flacceſcens vena Lyæo,
Hujus ſint alii fautores, ſydera, ſani;
Cynthia Bellottus; ſolus Tu φοῖβος Apollo.
Hæc Tu vivifico reparabis membra Calore;
Hæc Tu magnifico decorabis Tecta nitore,
Aſpice ſurgenti lætentur ut omnia Templo,
Grandævum videor mihi proſpectare *Jacobum*,
Aſpectus virtute Tui, torpore ſolutum,
Atq; reornato ſcandentem climate Cælos.
Ut renovat vires, ut concipit æthera mente;
Inſuper alatos, ultroq; citroq; meantes
Cœlicolas video, bona climacteribus illis
Nuncia portantes ſuperis: ac gaudia divum
Inde renarrantes terris de Præſule tanto;
Teq; cohortantes (propria ſat ſponte citatum)
Euge! opus hoc miræ pietatis perfice Præſul.
Te nempe ad decus hoc peperit natura, replevi
Dotibus eximii sDeus, ars perfecta polivit,

Ii

In gremio reſovet ter magni gratia Regis:
Ditavitque bonis tanta ad molimina natis.
Huc opulenta Tibi ſua fundit viſcera tellus,
Huc Tua Te virtus, ſorte ancillante, propellit.
Euge! opus hoc mira pietatis perfice Præſul!
Aggredere æternos, ſervit Tibi tempus, honores
His petitur Cælum Scalis, hac itur ad aſtra.
Nec mora, fervet opus, ſtructor, lapicida, peritus
Gypſator, ſculptor, fuſor, vitrarius: omnes
Artifices inſtant ardentes. Mœnia ſurgunt,
Diſſita quæ fuerant loca concamerantur Eriſmis,
Extima plumboſo velantur tegmine, pulchris
Intima Cælantur laquearibus: omnia miris
Sunt decorata modis: reſpondent omnia votis.
Nec deeſunt myſtæ, Celebrent qui ſacra, frequentes,
Sed numeroſa brevi totam quæ Compleat ædem.
Pompa Sacerdotum, Pſalmodorumq; Decano
Producente Chorum, Cantabit grata Jehovæ
Cantica, tantorum fonti, authoriq; bonorum.
Hæc mihi præſagit mens non ignara futuri.
Corpore (quis neget hoc?) ſpecioſo hæc templa Jacobus
Donavit præſul (pia nam decreta bonorum
Æquivalent factis) animam Rex ipſe Jacobus
(Hoc quoq; quis dubitat?) tribuet. Deus alme Jacobi,
Decretis benedic factiſq; utriuſq; Jacobi:
O fortunatam nimium, bona ſi tua noris,
Thermopolin, tali frueris quæ præſule, Rege!
Funde Deo ſummas ex imo pectore grates,
Et cole, perpetuo pietatis honore, Jacobos,
Quo pede Cæpiſti, Præſul digniſſime, pergas.

Epiſcopi Reſponſio.

Cupivi diu has ruinas, & hæc rudera videre, & contemplari, has vero ruinas, & hæc rudera videre, & contemplari jam dolet. Ingrediar tamen, ſed hoc animo, ut nunquam hoc more ſim reingreſſurus, priuſquam iſthæc melius tecta videro.

The Biſhops Anſwer.

I Have long deſired to ſee and contemplate theſe ruines and rubbiſh, and now it grieves me to behold them. However, I will enter, but with this intent, never to re-enter, till I ſee them better cover'd.

CHAP. IV.

Of the *Roman* Antiquities of *Bathe.*

Roman *Antiquities of* Bathe *divided into three Sorts. An Enumeration and Explication of them Many read, and underſtood otherwiſe, then by Mr.* Cambden. *Some Additions.* Roman *Coins.*

THE *Roman* Antiquities, Inſcriptions and Images, in the Walls and elſewhere of this City, were taken notice of by Mr. *Cambden* at his being here, and inſerted into his *Britannia*; yet becauſe *ſome* alterations have hapened to ſome of them ſince his time, and others ſeem to me to be read and underſtood otherwiſe, then he hath there repreſented them (not to mention what I have added, not to be found in him) I ſhall give a brief account; and what Explication I can, of them all, in order as they ſtand.

I ſhall diſtribute them into three Sorts. Thoſe that are between the South and Weſt Gates; Thoſe that are between the Weſt and North Gates; And thoſe in the Garden, formerly *Robert Chambers's*, now belonging to *William Burvurd*.

The firſt, of the firſt ſort we meet withall, (not taken notice of by Mr. *Cambden*) is the draught of a great Face, (which yet I cannot affirm to be truly *Roman*) about a foot in bredth, and neat as much in length; much reſembling the Moon, as it is uſually drawn. Whether this was a memorial of the Idoll of ſome Pagan (which is not very likely) or rather ſet up in memory of ſome Gyagntick perſon, whoſe parts were proportionable to this Face (which is more probable) I know not. Sure I am that *England* hath had thoſe Sons of *Anack*, as well as other Countries, as, beſides Hiſtories, the prodigious Bones digged up in ſeveral places thereof, do witneſs; and particularly (ſeeing we are apt to ſuſpect things done many years ago, relations of this nature being not like Pictures, *Quibus è longinquo reverentia major*) the entire Bones of a man of unuſual dimenſions, found not 20 years ſince, in *Gloceſter-ſhire*, in a Field, between *Over*, and *Thornbury*, do ſufficiently evince.

This Sceleton (as I heard it related by a credible Author, who had it from an eye-witneſs) was incloſed within the body of a maſſie Stone, ſo artificially cemented together, that the joynts were indiſcoverable. In the middle thereof (as it were in a Vault) ſate the Bones of two perſons, one very great, and the other leſs. The Scull of the greater was half an Inch thick, and the Ulna, as big as the Gentlemans Wriſt, who ſaw it (who yet is a corpulent man, and hath none of the leaſt) and as long as from his ſhoulder to his fingers ends. There were Inſcriptions alſo, and ſome Coins, both Silver and Braſs, about, and in it, but what they were, I cannot yet learn, having not hitherto had the opportunity to ſee either the one, or the other.

(mr Loe .

Since the Relation of the former perſon, having occaſion lately to ride into that part of *Glouceſter-ſhire*, where the bones were found, I received a Confirmation of it from two of the Sons of the Gentleman, in whoſe ground, and at whoſe great charges, they were diſcoverd, the Father being dead ſome four years ſince; only with this difference, that whereas the former Relator intimated the Bone, mentioned before, to be the Ulna, or the Radius; they apprehend it rather to be to the *Os Humeri*, or Bone from the Soulder to the Elbow, which they affirmed to have been as long as from the Elbow of any ordinary man to his Fingers ends; or the length of that Bone uſually and half the Ulna or Radius.

Alſo, that both the Sceletons were of extraordinary dimenſions, but one bigger then the other; & not both in one Sepulchre or Vault, but two diſtinct ones, diſtant about a yard each from other.

The Vault of the greater was not above five foot long, in the form, (according to their reſemblance) of a Jews-harp, narrow at the Feet, and broader about the Seat; ſo that this body muſt ſit, being judged by ſome intelligent perſons that ſaw it, to have been a man of nine foot in heighth. The other was longer, and the Bones ſuppoſed to lie at length, yet very little within the ground; having both great ſtones about and over them, in the manner of a Tomb.

After I had received their Information, they were pleas'd for my further ſatisfaction, to accompany me to the place, about a quarter of a mile from their houſe, in an Incloſure, hard by the high-way ſide, now made meadow ground, where I ſaw one Stone, which was at the entrance of the Vault of the greater Sceleton; ſtanding in the ſame place it was firſt ſet, about 4 foot above the ground; to which the other Stones did Anſwer: ſo that the length being five foot, and the heighth four, confirms the Conjecture of the Stature of the Body mentioned before.

The Tomb-ſtone that lay over the greater perſon, of an uneven, and (as I may term it) mazzardy ſurface, was ſo vaſt and weighty, that it was a buſineſs of great difficulty and labour to remove it; of a grayiſh colour without, but reddiſh within, and in many places ſtudded with a bright ſhining Stone, ſomewhat reſembling the Stones of St. *Vincents* Rock near *Briſtow*.

I cannot underſtand by them there were any Inſcriptions, and but two or three Coins, one having a Falcon (as they called it) which might be a *Roman* Eagle; another a *Cæſars* Head, with a wreath of Lawrel about it ; ſuppoſed to be the Head of *Claudius* the Emperour.

The common report there is, that it was the Tomb of *Offa*, King of *Mercia*, who yet was one of the middle Kings of the *Saxons*, and lived neer 250 years after the *Romans* departed out of *Britain*, of whoſe extraordinary ſtature, I know no Hiſtorian that takes any notice. It ſeems to have been a *Golgotha*, or common place of Burial, in thoſe times, the ground thereabouts, in a round, or rather an Oval figure, for neer half an Acre, affording great plenty of other Bones, and the place bearing the name of *Bone-hill*. The time of it's diſcovery was about the year 1652. Whether this great perſon were a *Roman*, or a *Saxon*, is not very eaſie to determine ; if a *Roman*, 'tis much they ſhould here, contrary to their common Cuſtom, both preſerve the Bones, and leave no Inſcription ; and if a *Saxon*, 'tis as difficult to ſolve the Phænomenon of the *Roman* Coins being not accidentally found among other rubbiſh, but in the Sepulchre it ſelf. Howeve, whether *Roman*, *Saxon*, or other, which I ſhall not at this time any further diſpute, it is enough for my preſent purpoſe that it was a body of more then ordinary dimenſions, and exceeding the heighth of an ordinary man in thoſe times by 3 foot, that is higher by the half then moſt men now.

2. A Foot-man with a Spear.

3. A Foot-Soldier brandiſhing his Sword, and bearing out his Shield.

4. Two kiſſing and clipping one another, which by the Crook in the right hand of one,

ſeems to be the remembrance of the kindneſs of a Shepherd to his Miſtris.

5. A naked man laying hold of a Soldier, which may repreſent an inſulting *Roman*, apprehending a poor, diſtreſſed, and captivated *Britain*.

6. Upon a Stone, with Letters ſtanding overthwart, This Inſcription:

ILIA
ILIA

This ſeems to have been part of the Monument of ſome Strumpet, ILIA, if I erre not in my conjecture, being the Relict of IVLIA, Wife to *Septimius Severus*, of whoſe Lewdnes, *Ælius Spartianus* gives an account in the life of that Emperour; and ILIA to be underſtood of *Ilia* the Mother of *Romulus*, concerning whom (omitting *Ovid*, *Juvenal*, and others that make mention of her Chaſtity) I ſhall content my ſelf with the ſingle teſtimony of *Horace*, who brings in *Lydia*, his Courtezan, making him this reply; Od. lib. 3.

Donec non alia magis
Arſiſti, neque erat Lydia *poſt Chloen,*
Multi Lydia *nominis*
Romana vigui clarior Ilia.
Id eſt,
Whil'ſt to Thee none elſe was dear
And Thou to me didſt not prefer,
Cloe, then I great of Name
Did outſtrip the Roman Dame.

Not that I conceive either of theſe to have died here, (though *Severus* himſelf did, and was buried at *York*) but ſome of the Siſterhood may, of later date, and might have the Superſcription of more noted names. For, that they beſtowed Monuments of this ſort of Creatures, is evident from a Stone, taken up not long ſince, very opportunely, at the Bell in *Walcott*, with this ſhort Inſcription:

Here lies *Merry Vibia*, [illegible]

VIBIA IVCVNDA
H. S. E

It being by them accounted ſomewhat abſurd, that thoſe who had ſo great a name whil'ſt they liv'd, ſhould be deſtitute of one, when dead.

Another thing that inclines me to this opinion alſo, is, a Hare, a venereous creature, and embleme of Luſt; witneſs that queſtion in the Comædian, *Tute lepus & pulpamentum quæris?* unto which theſe letters were formerly annexed; for in Mr. *Cambdens* time it was here running, but ſince this light-foot is run quite away.

7. Two Roman heads, one within the Cope of the wall, and another in the outſide thereof, hard by, whereof that within the Cope of the wall, hath an ear ſtanding up, ſomewhat like the ear of a horſe.

8. A little higher, toward the Weſt-gate, letters ſtanding croſs, which I place thus:

III. VS. SA.
IS. VXSC.

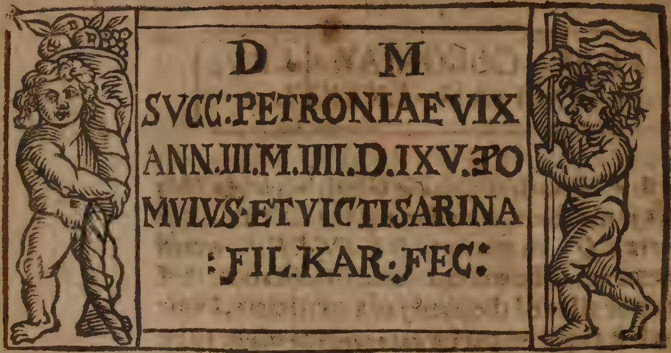
9. As for *Meduſa*'s head, with hair all ſnakes, I cannot upon the beſt enquiry I can make, find it out, unleſs Mr. *Camden* meant that little Image cloſe by the Weſt-gate, which ſeems now rather to be one, with hands lifted up, and meeting above the head, as it were rejoycing.

10. Neither doth *Ophincus* occur to me, which I am apt to think that learned Antiquarian, in haſte, might miſtake, for ſomething between the loving couple and the naked man, like a Roſe, with a branch about it, reſembling a Serpent.

Of thoſe of the ſecond ſort, between the Weſt and North-gates, the Firſt is part of the Grave-ſtone of one, whoſe name began with theſe three letters, I O P. The Inſcription thus:

VRN
IOP.

2. The next is a Monument of one of the children of two Romans, *Mulus & Victiſarina*, with a longer, and exactly Roman Inſcription, in a Sepulchre Table, between two little Images, whereof the one holds the horn of *Amalthæa*, the other flouriſheth a Banner. The Inſcription which I read ſomewhat different from Mr. *Cambden*, is this: D. M.



D M
SVCC:PETRONIAE VIX
ANN.III.M.IIII.D.IXV.PO
MVLVS.ET VICTISARINA
:FIL.KAR.FEC:

i. e. To the dead Ghoſt of *Succ. Petronia*, who lived 3 years 4 moneths, and 14 daies, *Mulus* & *Victiſarina*, in memory of their dear Child, made this. What that PO, at the end of the ſecond line is, unleſs put for *Et mo*, and ſignifies *Et moritur*, I cannot at the preſent conjecture.

3. *Hercules* bearing his left hand aloft, with a Club in his right hand. Yet I leave it to others to judge, whether it may not ſomething reſemble one of thoſe little Images mentioned but now.

4. The laſt I obſerve, and neereſt to the North-gate, is a memorial of a Roman Senator of the Colony of *Gloceſter*, a City built by the Romans, who alſo placed there a Colony called *Colonia Glevum*. The Inſcription after this manner. *Cambden, Br.* p. 360.

DEC. COLONIAE GLEV.
VIXIT AN. LXXXVI.

i. e. Decurioni Coloniæ Glevi, vixit An. 86. yet in the ſtone, after the figures *LXXX.* I obſerve a *Q*, in this ſort, *L X X X*^{Q}*V I.* which ſeems not to be without ſome ſignification. If I may be allowed the liberty of a conjecture, I ſuppoſe it might be put for *quinque*, and ought to be read *L X X X*^{Q}*V I N Q.* There being room enough for, and as it were the marks of two other letters, *N* and *Q*, and the party aged 85, not 86.

And whereas I render *Decurio* a Senator, I pitch on this ſignification of the word, as moſt proper here, of which *Roſinus* gives the reaſon; *Senatores in Coloniis, ut etiam in Municipiis, Decuriones vocabantur, eam ob cauſam, quod Pomponio* JC. *auctore, decima pars eorum qui deducerentur, publici conſilii gratia, ſit ſolita conſeribi.* I know *Feſtus* mentions another, and more uſual ſignification of the word, to wit, an Officer over ten horſe-men. *Decuriones, inquit, appellantur, qui denis equitibus præſunt*; of which, if any one pleaſe to underſtand it, he ſhall have my leave.

Ant. Rom. l. 10. c. 24.

5. As for leaves folded in, and *Hercules* ſtreining two ſnakes, I cannot be ſo fortunate yet, (though my ſearch hath been particular) to light upon it.

The Antiquities in the Garden are only two

Inſcriptions in two Grave-ſtones, with their Urns: The one an Epitaph of *Caius Murrius*, of the tribe called *Arnienſis*,(the 25 tribe among the Romans, ſo called from *Arnus*, a River in *Tuſcany*, as *Car. Sigonius*, and *On. Panvinius* relate; a modeſt pleader in the Julian Court, a Souldier of the ſecond Legion, and continuing in pay 25 years. The Inſcription as follows.

C. MURRIVS
C. F. ARNIENSIS
FORO. IVLI. MO
DESTVS. MIL
LEG. II. AD. P. F.
IVLI. SECVNDI.
AN. XXV. STIP
H

2. The other, an Epitaph of *Marcus Valerius*, a Latin, (for ſo I read, and not *Eatinus*, as Mr. *C.* a Souldier of *Auguſtus* his Legion (if not the xx) 35 years of age, and 20 years in pay. The true Copy thus;

DIS MANIBVS
M.VALERIVS.M.
ſOL.LATINVS.C.EQ
MIIES.LEG.XX AN.
XXV/.STIPEN.XX.
H. S. E.

Where it may be noted by the way, that this man had ſome favour to be admitted at 15 years of age, when as the uſual time of liſting Souldiers was not till 17. Alſo, whether C. EQ. be to be read, as ſome would have it, *Cohortis Equitum*, I ſomewhat doubt, the *Copiæ pedeſtres*, or foot, commonly among the Romans, being divided in *Cohortes, Manipulos & Centurias*, the *Equeſtres*, or Horſe, *in Turmas & Decurias.*

Al: ab. Alex. Gen. dier. L. 1. c. 20.

Many Roman Coins are alſo found in theſe parts, two of which I have by me, digged up at *Walcott* (whence the two laſt Inſcriptions came) in the ſame houſe with the Inſcription of *Vibia* before-mentioned. The one neer 1620 years old, being a Braſs-piece of *Veſpaſians*, in which all the letters on the face ſide are decayed, except *AES. VES*, and ſome marks of *PAS.* on the reverſe, *PIETAS AUGUSTI* (as I think) the three former letters of *Pietas* being very obſcure) with an Image between S C. ſignifying *Senatus Conſultum.*

Car. Sigon. de Jur. Rom. l. 1. c. 15. Roſin. Ant. Rom. 1. x. c. 5.

The

Cambden. Br. p. 72.

Caius. Carauſius. Pius. Fælix. Auguſtus.

The ſecond, ſome 200 years after, bearing the name of *Carauſius*, who in the time of *Diocleſian* and *Maximian* Emperors, took upon him the Imperial Enſigns, and ſeized *Britain*. The Circumſcription thus *C. CARAVSIVS. P.F. AVG.* on the other ſide, *PAX AVG.* and under an Image, *MLXX.* which I ſuppoſe to be the year *ab Urbe Condita.*

CHAP. V.

Of the Nature, Uſe, and Virtues of the *Baths.*

Baths of Bath *much of the nature of the* Thermæ Aquenſes *in* Germany. *Certain Parallels between.* Bath *and* Akin Bladud *in ſome meaſure vindicated.*

I Come now to ſpeak ſomething of the Nature, Uſe, and Vertues of the *Baths.* And here it cannot be expected I ſhould ſay much, becauſe my experience of them as yet hath been but little, and the Obſervations I have made ſeem fitter, (as they are intended) for a foundation to a greater work, (which time, and variety of experiments muſt compleat) then, at the preſent to be communicated to the publick. And to make ſome compenſation for my brevity in this thing (which is juſtly deemed the moſt material of all other) I ſhall take the boldneſs to engage, as ſoon as time and opportunity ſhall permit, to make a through ſearch into the cauſe of the Heat, Nature, and efficacious operations of the Baths, and perhaps give a more ſatisfactory account of the former, than yet hath been given by any; and for the later, I ſhall not build on the hay and ſtubble of the talk and relations of perſons byaſs'd and concern'd, but on the ſolid baſis of reaſon, obſervation and experience. In the mean time, as I would not ſeem ridiculous to ſome, in treating too largely of what I have not yet made a clear inſpection into, ſo I would not be accounted abſurd by others, in wholly waving the principal part of my Subject.

To offer then a courſe bit to the eager appetite, till time ſhall favour us with a better treat; I conceive that the Baths of *Bath* come very neer the nature of the *Aquenſes* in *Germany*, the knowledge of which may be a great help to the better underſtanding of our own. I ſhall therefore, out of the ſuccinct, but pithy diſcourſe of theſe waters, compoſed by the learned and Judicious Phyſitian *Fran. Fabritius Ruremundanus*, ſometime Phyſitian there, take notice of ſome Parallels between that place and *Bath*, in which, beſides many pretty remarkable Coincidences, the nature of the Countrey, and parts adjacent, is in ſome meaſure diſcovered.

The firſt is, that Hiſtories relate, that the Hot Waters there were found out by a Prince, one *Granus*, brother, as 'tis ſaid, to *Nero* the Roman Emperor; who firſt diſcovering theſe Baths, among the mountains and woods, built a Caſtle, and dwelt there, of which, in the Author's time, there was a monument ſtanding, called *Turris Grani*.

Secondly, That the City was called by the name of the Waters, to wit, *Aquæ Grani~~s~~*, which ſome improperly call *Aquiſgranum. Ab incolis Aquæ Grani appellatæ ſunt, cum Thermæ, tum locus ipſe, deducto ſcil. nomine ab Aquis Calidis, & Grano repertore, manſitque appellatio poſtea & Urbi, niſi quod quidam non ſatis apte immuta*ta *inflexione, Aquiſgranum appellent.* The Inhabitants ſaith *Ruremundanus*, call the Place, as well as the Waters, *Aquæ Grani*, by a name drawn from the Hot Waters, and *Granus* the Founder, which name afterwards the City had, but that ſome, not ſo properly, changing the termination, call it *Aquiſgran.*

Thirdly, That the City is *ſita in valle, & montibus circumquaque cincta*, ſeated in a bottom, and encompaſſed about with Hills. That the Hills (beſides Wood for Fire and Timber) contain Quarries of Stone for Building. That cold Springs ariſe within & without the City in great abundance. That at ſome diſtance off is found Lead, and a Bituminous Earth, which mine Author calls *Terra nigra, foco culinario aptiſſima.* p. 14 That in the City are two Chief Bathes, The one called the *Kings*, the other the *Cornelian.* In the Suburbs, not far from the South Gate, are more Hot ſprings, called, from the abundance of Hogs that are there about, the *Porcetan Bathes*, which being not ſo powerfull as the reſt, are leſs uſed. And laſtly, that I may mention ſomething that would be advantageous to both, and both do want, viz. *a Navigable River*, which ſaies *Rurem.* would compleat its happineſs. *Nihil,* *inquit, ad fœlicitatem deeſſe videtur, quam Navigabilis Fluvius.* p. 14.

Now to give you the Counter-part of the parallel: 'Tis obvious to obſerve, that to the firſt correſponds the Hiſtory of King *Bladud*, which ſeems not to be ſo fabulous, as many men imagine. For, probably, many Relations we have of perſons, and things, [redacted] of thoſe elder times, when ignorance ſo much prevail'd, and men had little ſubtilty in their actions, and leſs politeneſs in their ſpeech, may have much of truth in them, though they now ſeem odd, and ridiculous to us. And I am apt to think, that many old Realities do ſuffer much, on no other account then their ſuſpicious appearances, conſonant then to the temper, and genius of thoſe times. Juſt as 'tis reported of ſome old women in *Lancaſhire*, that they go for Witches, meerly becauſe they look like ſuch. Not conſidering, that a great deal leſs time then 2000 years, hath made conſiderable alterations, in the manners, lives, and cuſtoms of men.

And whereas King *Bladud* had the name of a Magitian, I look upon it as a greater argument of his more then ordinary learning, then note of reproach, the wiſeſt men in thoſe times, and long after to, being reputed ſuch, and he recorded a wiſe and eloquent Philoſopher, and Mathematian, accompliſh't (as the times then would bear) with treaſures of forrein, and domeſtick knowledge, having ſpent in Study, (as is reported) beſides many, doubtleſs, afterwards, in his own Countrey, eleven years in his Minority, at *Athens*. Of whom that you may receive a more particular account, I ſhall not think much to give you the Engliſh of what *J. Bale* in his Book *De Scriptoribus Anglicis*, writeth of him. *Bladud* ſurnamed the Magician, the 10th King of the *Britains*, was ſent in his Youth, to the famous City of *Athens* in *Greece*, there to be inſtructed in Philoſophy, and the Liberal Sciences. And when he had there ſtudied a certain time, hearing of the death of *Ludhudebras* his Father, he returned home again, bringing with him four expert Maſters in many Sciences, not thinking it meet that his Countrey ſhould lack any longer ſuch ſingular ornaments of Learning as they were. Theſe Philoſophers, as *Merlin* writeth, he placed at *Stamford*, in a very pleaſant Soyl, and made Schools for them, to the intent they ſhould there read the liberal Sciences, where they had many times a great Audience. He was a man very cunning and skilfull, as well in Prophane Sciences of the Gentiles, as in all Wiſdom and Knowledge that the Græcians excelled in; but eſpecially ſtudious and very well ſeen in the Mathematical Arts and Sciences, whereupon one of the Sybils, that lived in his time, wrote and dedicated unto him a Book of Propheſies. Some affirmed that the ſame *Bladud* built the City of *Bathe*, and therein made by a wonderfull Art, certain Hot Bathes, for the uſe and commodity of the people, which do yet remain to this day, committing the Conſervation thereof to the Goddeſs *Minerva*, in whoſe honour he cauſed a Temple to be there erected, to the intent, that being preſerved by ſo mighty a Goddeſs, they ſhould never fail, but continue for ever; they write alſo, how that he read and taught Necromancy throughout all his Realm. But theſe things I ſuppoſe are feigned matters.

To the ſecond particular anſwers the Name of Bathe, taken from the Waters. For this Name, as is noted before, was given to the City, ſome time after its foundation, when the Hot Waters came into greater requeſt, being called firſt, after the name of the Founder, *Caer Blaidin.*

To the third, agrees the ſituation of *Bathe*, being exactly the ſame. To the fourth, the Quarries of Stone, upon *Claverton Down, Horſecomb*, &c. To the fifth, the Springs of *Cornwall* in *Wallcot-fields, Beechenclift*, &c. To the ſixth, *Timsbury, Burnet*, (and though the diſtance be ſomewhat greater) *Mendip-Hills.* To the ſeventh, the *Kings Bathe*, with its appendage, the *Queens* and *Croſs-Bath.* To the laſt, the *Horſe-Bath*, without the South-Gate, doth in ſome meaſure, anſwer, though it hath no Hot Springs of its own, but is ſupplyed by the Overplus of Water coming from the Kings Bath.

And whereas it is recorded, *That theſe Bathes are not wholſome at all hours, being from 8 of the Clock in the morning, to three in the Afternoon, Scalding Hot.* It is clear, that the inequality of the heat proceeds not ſo much from the Waters (which in themſelves, are obſerved to vary very little from a conſtant, and equal degree of heat, both Winter, and Summer) as from the beating of the Beams of the Sun in hot weather on the Surface of them, which being more troubleſom to

Camb lens Br. pag. 233.

to the Bathes, and Mornings and Evenings more convenient for Bathing, the middle part of the day is not made uſe of, though the Waters then are as wholſome as ever. But we may well pardon this learned and induſtrious perſon, if he hath not in this, and ſome other particulars, done the Bathes right, in regard the vaſtneſs of his deſigne, and urgency of his occaſions, might haſten him hence, ſo that, haply, he could not throughly inform himſelf in things of this Nature.

To conclude this Chapter, I ſhall mention ſome parts of the deſcription of that City, mentioned before, in the Authors own words, and compare them with what Deſcription Dr. *Venner* hath given of this of *Bathe*. *Aquæ Grani appellatæ ſunt ab incolis, cum Thermæ, tum locus ipſe, deducto ſcilicet nomine ab Aquis Calidis &c.* Ruremund. De Baln. Aq. p. 11. 12. &c. *Hæc urbs tametſi in valle ſita, & montibus circumquaque ſepta ſit, incredibili tamen gaudet aeris ſalubritate. In proximo urbis ambitu lata fere planities eſt, in qua & paſcua ſunt, alendo pecori commodiſſima, & agri pingues. Nec deſunt fontes, tam foris paſcua irrigantes, quam intus diverſis urbis locis, publice in plateis ſcaturientes. Ad Orientem Rhenum, ad occidentem habet Moſam. Sed alias dotes omnes, meo quidem judicio, vincunt Aquarum Calidarum uberrimi ſimul ac Saluberrimi fontes.* The words of Dr. *Venner*, as neer the Engliſh of the former as may be, are theſe. Tr. of Bath. p. 1. *Bathe*, ſo called from the Bathes in it, is a little, well compacted City, &c. Although the ſite thereof, by reaſon of the Vicinity of Hills, may to ſome ſeem not pleaſant, being almoſt environed with them, yet for goodneſs of Air, neerneſs of great and delectable Rivers, pleaſant Meadows, and plenty of excellent Water, brought down from the adjacent Hills into the Streets, it is pleaſant, and happy enough; But for the Hot Waters that boyl up even in the midſt thereof, is more delectable, and happier then any other of the Kingdom.

CHAP. VI.

Of the Bathes in particular.

Of the three Hotter Bathes, viz. *The Kings, Queens, and Hot Bathe. But chiefly of the Kings, and in what Diſtempers Bathing therein is profitable.*

HAving thus far drawn the Parallel between *Bathe* and *Akin*, which, as they cannot be conceived to agree in every punctilio,(no Compariſon, as they ſay, running on four feet) ſo it ſeems they cannot correſpond in ſome of thoſe particulars before recited, without a Communication alſo in the Waters of many of the ſame Medicinal Vertues. Having done this, I proceed to a light guſt and reliſh, of the Vertues, and uſefulneſs of every Bath in particular.

And here taking it for granted, till better information, what the very learned and incomparable Doctor *Jorden* hath obſerved, That there is very little difference in the Nature of the Bathes of *Bathe*, but in the degree of heat, they all proceeding from the ſame Mine, which according to the intenſeneſs or remiſsneſs of its heat in divers parts, and the directneſs or indirectneſs of the paſſages from it, may cauſe this Variation; and alſo, that the Minerals impregnating the Bathes in general, are Bitumen, Nitre, and Sulphur, I ſhall run the Parallel a little further, and ſpeak ſomething in particular of all the Bathes; and firſt of the Kings.

The *Kings Bathe* exceeds the reſt in Heat
and

and Dimenſions, being the hotteſt, and largeſt of all. And whereas there is another that for ſome time hath, I know not how, appropriated the name that is common to them all, and therefore gives moſt people occaſion to imagine the heat to be more intenſe there then any where elſe, I conceive, at preſent, the heat of that Bath, to come as much ſhort of that of the Kings, as the Croſs Bath, in that inſtance, yields to the Queens.

This Bath, as to its vertues, much reſembles the Kings Bath at *Akin*, that is, conſiſts of the ſame Minerals, though probably, not in the ſame proportion; the German Kings Bath being accounted chiefly Sulphurous; This of Bath, Bituminous. Which, yet notwithſtanding conſidering the great affinity Bitumen hath with Sulphur, and the ſlender difference in their qualities, being both ſuppoſed moderately hot and dry, and therefore muſt both (according to the common notion) attract, reſolve, mollifie, and diſcuſs, will not alter much the Caſe, not to mention that *Baccius* and *Bauhinus*, and (what is more material) two of our own Countreymen, Doctor *Turner*, and Doctor *Venner*, do all agree, That they are chiefly Sulphurous. And whereas *Rurem.* ſaith of the Kings Bath at *Akin*; *Refert hæc aqua modis omnibus naturam Sulphuris, cum admiſſione Nitri modici*; making mention of Sulphur and Nitre, but omitting Bitumen, I queſtion not, but upon Examination, it would be found that Bitumen alſo was concern'd in that Bath, as well as the Cornelian in the ſame City. And the Catalogue of Diſeaſes, for which

De Baln. Aq. p. 18.

which this *Bath* is profitable, ſuggeſts as much: bituminous waters being of a heating, drying nature, and ſuppling the nerves.

The Encomium he gives of this *Bath*, and the Diſeaſes he affirms it to do good in, (which for the moſt part agree to this of *Bath* alſo) are as follows. This *Bath* is profitable for many diſtempers, eſpecially cold and moiſt: for it heats powerfully, dries, drives the humors from the inward parts to the outward, diſcuſſes, attenuates, abſtergeth, and that I may ſpeak more particularly, good chiefly in affections of the Nerves, as Convulſions, Palſies, as well alone, as accompanying an Apoplexie, in defect of ſenſe or motion, or both. It helps ſtiff, benumm'd, and trembling limbs, does good in the ſeveral ſorts of Gouts, eſpecially Hip and Hand-gout. Diſcuſſeth Tumors: Relieveth thoſe that are ſtreightened about the Midriff: thoſe that have a Cachexy, or ill habit of body: The Dropſie (eſpecially the Anaſarca) and Jaundice. Thoſe that are troubled with a cold diſtemper of the Stomach, Liver or Spleen. Excites and reſtores Appetite. Eaſeth pains in the ſides (without a feavour) Bowels or Loins. Helps cold and moiſt diſtempers of the Womb; furthers Conception, provokes the Terms, giveth eaſe in uterine pains; takes off wearineſs as well ſpontaneous, as by exceſſive labour and travel, &c. moſt proper for thoſe of a cold Conſtitution, and ſomewhat corpulent, and not ſo convenient for dry and extenuated perſons. To which may be added Lethargies, Epilepſies, Cramps, Deafneſs, Forgetfulneſs, Aches, and many others of the like nature,

ture, with the Scorbute, (provided the body be duly prepar'd before, and the *μιάσμα* in that diſtemper well corrected) and the extremity of the pains of the Spleen.

The Hot Bath is ſomewhat cooler, and profitable in the like caſes; and Dr. *Venner* hath obſerved moſt efficacious for any weakned and relaxed limb.

The Queens Bath is the next for heat, and hath the ſame virtues with the Kings, out of which it was taken, having no hot ſprings of its own, but is ſupplyed out of the Kings, where the water ſtanding as it were in a Cooler, is made more temperate, and fitter for tender bodies, that cannot well endure ſuch a degree of heat, as in the Kings Bath.

CHAP.

CHAP. VII.

Of the Croſs Bath, and its Virtues.

THE *Croſs Bath*, as to its degree of Heat, abating ſomewhat of the Queens, is the cooleſt of all, of which I may ſay, as a ſtranger ſometime did of this City, that it is *E minimis pulcherrimum*, and though it be little, is not on that, nor any other account deſpicable; *Ineſt ſua gratia parvis.*

Cap. 17. This *Bath* is thought by Dr. *Jorden* to participate more of Nitre than the reſt, and therefore is obſerved to ſupple & mollifie ſomewhat more, receiving a greater degree of cleanſing and penetrating from the Nitre; Conſonant to which *Rurem. de Bal. Aq. p.* 21. 'tis ſaid of the *Cornelian Bath* in *Akin. Aqua hujus Balnei ſulphurea quidem eſt, ſed ſalis non parum habet admiſtum, quin & bituminis nonnihil ineſſe certis indiciis deprehenditur; Quo fit ut hæc aliquanto valentiore ſit exiccandi, extenuandiq; potiſſimum facultate, quam aliæ, diſcutit, abſtergit, ac mollit, i. e.* The water of this Bath is indeed ſulphurous, but hath a conſiderable quantity of ſalt mixed with it, and ſome Bitumen: wherefore this hath a more powerful drying, and attenuating faculty than the reſt, diſcuſſes, cleanſes, and mollifies.

And whereas inſtead of Nitre, he mentions Salt, the difference, though ſomething I confeſs, cannot be great, ſince many of the ſame vertues are both by him and others attributed to ſaline Waters, as Nitrous; Nitre it ſelf being a kind of Salt. From the mixture of the Sulphur and Bitu-

Thermæ Nitroſæ omnino eaſdem facultates habent, quas Salſæ, &c.

Bitumen, it heats, diſcuſſes, and ſupples; from the Nitre, it receives an addition of cleanſing, and penetrating.

Fuch. Inſt. Med. lib. 2. S. 5. c. 28.

This Bath then muſt be of Excellent Uſe in all Contractions, Indurations, and Reſolutions of the nervous parts, diſperſe, and diſſipate cold Tumors; relieve Cacheꝺtick, Hydropick, and Corpulent perſons; oppoſe the Sciatica, Cramps, Convulſions, Defluxions, Barrenneſs, and the Whites in Women; uſefull in Cutaneous Diſtempers; as the Itch, Scabs, Morphew, and Leproſie. Good for fleſhy, cold, & moiſt bodies; and not ſo proper for hot, and dry Conſtitutions.

And here I muſt crave leave to add, that the reaſon I conceive why the Croſs Bath comes not up to the heat of the reſt, is partly on the account of its being ſerved by fewer Springs, but chiefly proceeds from the greater proportion of Nitre it contains, which being of a cooling nature, may more allay the heat ariſing from the Sulphur and Bitumen there, then in the other Bathes. And that Nitre doth more abound in that Bath, then in the reſt, may probably be collected, as from other reaſons, which I here forbear to mention, ſo partly from this, that it ſooner penetrates the body, and hath an eaſier, and quicker ingreſs into its paſſages and pores, to the great relief of ſome, though it ſeems Paradoxical, in Nephritick Diſtempers.

But I hope I may be excuſed on the Score of my former Engagement, if I am not more particular at this time, in things of this nature, till a juſt amaſsment of Obſervations and Experiments,

riments, and a rational deduction of Concluſions from them, (which I hope in ſome time to accompliſh) ſhall either confirm me in the opinion I now have of the Nature and Vertues of the Baths of *Bathe*, or ſupply me with a better.

Atq; hæc Hactenus.

FINIS.
